

# the **Iron Age**

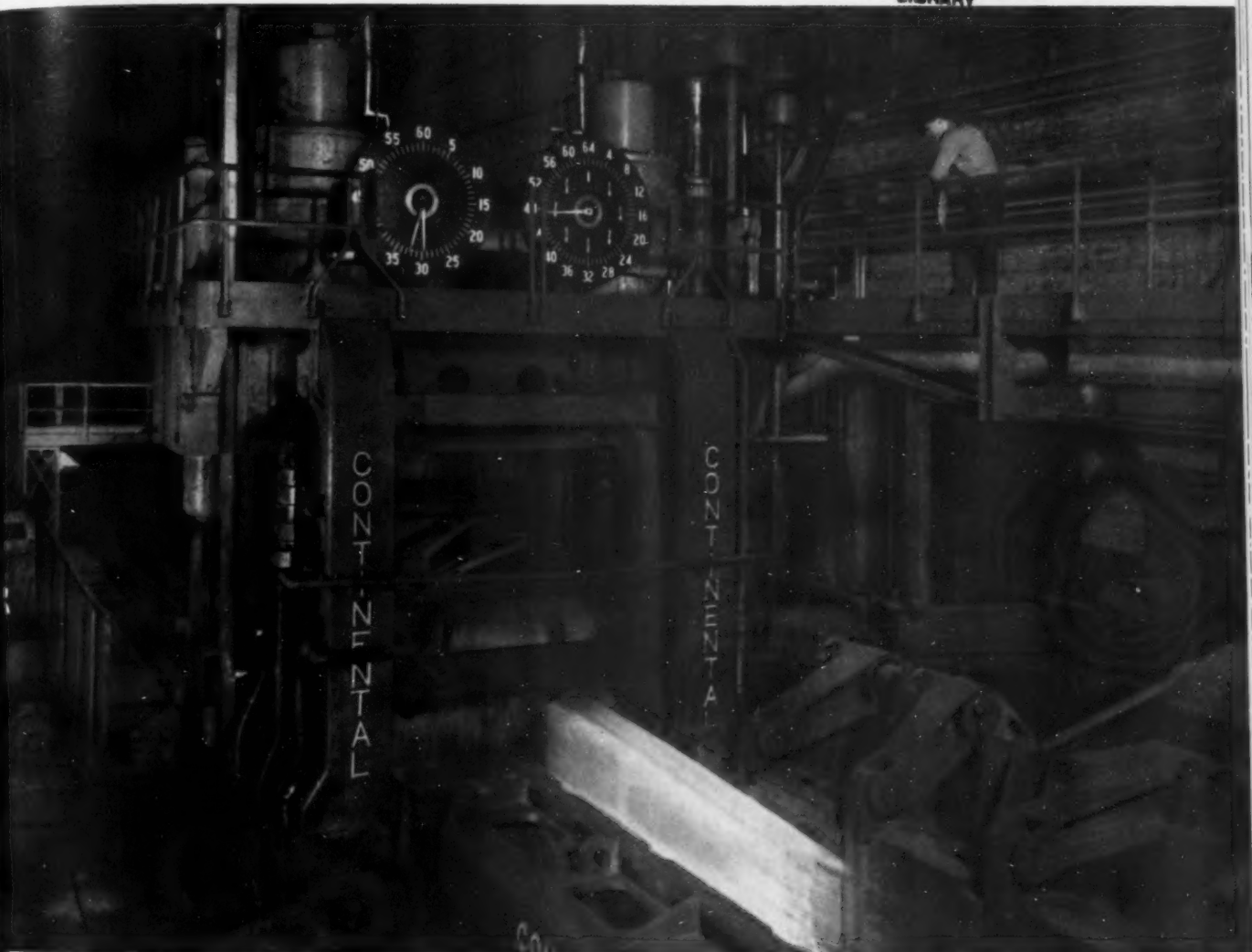
A Chilton Publication

What's ahead  
for  
1955?

See page 95

THE NATIONAL METALWORKING WEEKLY • NOVEMBER 18, 1954

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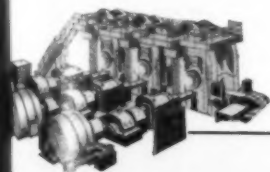


46-INCH HIGH LIFT BLOOMING-SLABBING MILL

## Producing Per Schedule

This mill has been producing per schedule ever since the installation was completed. Continental builds blooming-slabbing mills in a complete size range, offering twin-motor or pinion-stand drive, high-speed screw-downs and manipulators, plus other features designed for your specific needs. Continental also designs and manufactures universal, plate, hot strip, cold strip, temper, structural, rail, billet, rod and merchant mills. Continental service is complete from preliminary engineering to satisfactory operation, with all auxiliaries.

- COMPLETE ROLLING MILLS
- ROLLS • ROLL LATHES
- CONTINENTAL CHIPPER
- SPECIAL MACHINERY
- STEEL CASTINGS • WELDMENTS
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East Chicago, Ind. • Wheeling, W. Va. • Pittsburgh, Pa.  
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**CONTINENTAL**  
Foundry & Machine  
Company

# "It sets the pace in the industry"



## FLORIDA MACHINE & FOUNDRY CO.

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ASST. SUPERINTENDENT

Mr. Charles W. Vokac  
Manager, Hydro-Arc Furnace Dept.  
Whiting Corporation  
Harvey, Illinois

Dear Mr. Vokac:

The Whiting Hydro-Arc Furnace which you furnished us recently is operating very satisfactorily. Anyone in the market for an electric furnace should certainly look into the merits of the Whiting Hydro-Arc before purchasing a furnace. In my opinion, it sets the pace in the industry; the Whiting Hydro-Arc is really an up-to-date furnace.

Sincerely yours,

FLORIDA MACHINE & FOUNDRY CO.

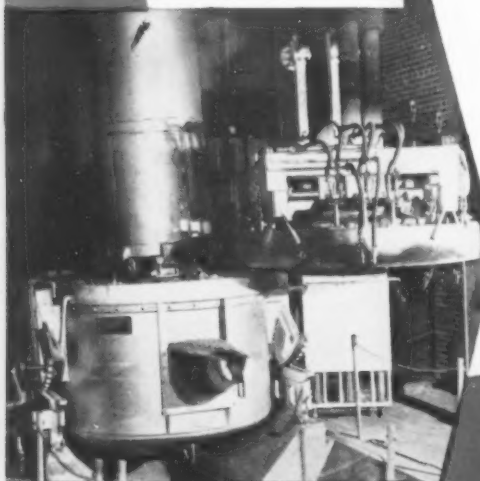
*Thomas W. Peacock*

Thomas W. Peacock  
Assistant Superintendent

TWP/wb

ELECTRIC STEEL CASTINGS

Whiting Hydro-Arc  
Size 6MT Electric Furnace  
at Florida Machine is  
energized with 2500 KVA  
substation equipment.



Roof of Whiting Hydro-Arc Electric Furnace at the Florida Foundry is swung aside so that a Whiting Siver type drop bottom bucket may release a cold charge into the furnace.



Write today:

... for 40 page bulletin FY-168. Gives complete information on Whiting Hydro-Arc Electric Furnaces.

**WHITING CORPORATION**

15601 Lathrop Avenue, Harvey, Illinois

# WHITING

**HYDRO-ARC  
ELECTRIC FURNACE**

# Quenching Media for Alloy Steels

*This is the seventh of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.*

In the quenching of alloy steels, several points require consideration, among them being the size and shape of the piece, the type of steel involved, the quenching medium, and proper agitation of the quenching bath.

The composition of the steel has an important bearing on the selection of a quenching medium. As an example: shallow-hardening steels require a fast cooling rate, whereas deeper-hardening steels require progressively slower rates as the alloy content increases.

Three commonly used types of quenching media for alloy steels are water, oil, and air. These are discussed below in the order of quenching severity: (1) **WATER.** Fresh water is entirely satisfactory only when used as a flush. Salt-water solutions are generally used in still baths to avoid the bad effect of bubbles resulting from dissolved atmospheric gas. It should be noted that the quenching rate drops as water temperature is increased. The range of 70 deg to 100 deg F is recommended.

(2) **OIL.** An oil quench cools more slowly than water, and faster than air. Oil-hardening steels can be hardened with less distortion and greater safety than water-hardening steels. Mineral oils are generally used because of their low cost and relatively stable nature.

(3) **AIR.** If sufficient alloying elements are present, critical cooling rates are decreased to the extent that certain steels can be quenched in either still or forced air.

While the choice of quenching medium is of prime importance, there is another factor that should not be overlooked. This is the agitation of the quenching bath. The more rapidly the bath is agitated, the more rapidly heat is removed from the steel, and the more effective the quench.

Bethlehem metallurgists will gladly help you with any problem related to quenching or other phases of heat-treatment. They are men of long practical experience in this field, and they understand fully the advantages and limitations of each method. Always feel free to call for their services; their time is yours, without obligation.

Remember Bethlehem, too, when you are next in the market for AISI standard alloy steels, special-analysis steels, or carbon grades. We are always in a position to meet your needs promptly.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

**BETHLEHEM** *ALLOY* **STEELS**





Starred Items are digested at the right

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Address mail to 100 E. 42 St., N. Y. 17, N. Y.

## NEWS DEVELOPMENTS

### 1955 BUSINESS PROSPECTS LOOK GOOD — P. 95

The recession that wasn't there is over. It was over several months ago but an extended vacation in thousands of plants served to delay the rebound. Here are the factors that will push next year's industrial activity close to '53 levels: Strong seasonal factors now will lift year end indexes high and carry them into '55 at good levels; inventories were cut too deeply; defense orders are up and will climb further; buying pattern has reversed; farmers are spending more; and political atmosphere is good.

### CARPENTER STEEL OPENS NEW HOT MILL — P. 101

A new and highly efficient specialty steel hot rolling mill was opened by the Carpenter Steel Co. at its Reading, Pa., works. New facility for bars, rod, coils and strip has unique layout permitting quick-change from one product or size to another. Mill is twice as productive per manhour as Carpenter's older facilities which it supplements.

### EAST GERMANS FIND TOOL MARKETS — P. 103

Communist-controlled East German machine tool builders now offer a full line of old-fashioned but well-built equipment. Prices are lower than those of the West—and can be cut to serve political ends, beating any competition. Deliveries of machine tools from East German manufacturers are prompt.

### INVESTMENT CASTING MAKES HEALTHY GAINS—P. 105

Only a handful of shops used investment casting technique in 1940—today the list tops 100. Top metals cast by the method are stainless with about 25 pct of total output and aluminum with 21 pct. First half business volume was under '53 but things are moving up and the outlook is definitely good.

### PLAN TAFT-HARTLEY REVISION IN 1955 — P. 125

Labor Secretary Mitchell hopes to offset union criticism by recommending Taft-Hartley rewrite, lifting minimum wage. Fear New Deal-Fair Deal runaway.

### NEW TOOL MODELS GET DESERVED FANFARE — P. 131

Tool builders are putting more razzle dazzle into their new model introductions. Clean, attractive demonstration rooms are gaining popularity as sales aids. New gains are predicted for tool and die industry. British tool sales are improving.



## ENGINEERING & PRODUCTION

### SHELL MOLDING PROCESS IS MECHANIZED — P. 147

The shell molding process, with its improved foundry product, has proved highly adaptable to mechanization. New automatic and semiautomatic equipment forms, cures, and ejects shells at a high production rate. This winning combination is helping to improve the industry's competitive position.

### AUSTENITIZING AFFECTS ALLOY STEELS — P. 151

Austenitizing temperature strongly influences the amount of retained austenite in 9395, 4695 and 8695 steels. Both austenite composition and Ms temperature can be controlled through manipulation of austenitizing temperature.

### IMPROVED DIE DESIGN REDUCES DISTORTION — P. 154

Modern press quench methods make it possible to hold close tolerances on precision parts during heat treating. Angular relationships and dimensions of complex parts can also be held to close tolerances. But to get maximum advantages from this method, dies must meet requirements peculiar to the process and to the various parts involved.

### FORCE, TEMPERATURES EVALUATE TOOL LIFE — P. 156

Cutting forces and temperatures have been successfully used as a guide in evaluating tool life on gray cast irons. The studies support the belief that lower forces and temperatures often mean greater tool life.

### HIGHLIGHTS OF METAL SHOW AND CONGRESS—P. 159

Bigger and brighter than ever, the 1954 Annual Metal Show and Congress held in Chicago drew some of the largest crowds in its 36-year history. Many new production ideas, materials and equipment were presented to engineers, production men and business executives in technical sessions and at the show.

## MARKETS & PRICES

### OFFER NEW OIL GOODS PRICE-DELIVERY PLAN—P. 98

Acting to meet rising competition in oil country goods, U. S. Steel offers "in-transit" storage at barge terminals. Charge barge rate plus local delivery and handling. Helps reduce geographic disadvantage. Expect other eastern producers to follow.

### OIL INDUSTRY TO USE MORE STEEL IN '55 — P. 99

All signs point to continued growth on all fronts for the petroleum industry next year. Refinery construction, drillings, pipeline building and other phases of the industry should all pass levels reached this year. Steel buying stays heavy, and some predict a very tight market if the industry steps up its operations as expected.

### STEEL GAINS SHOW ON LAGGING PRODUCTS — P. 207

Sharp improvement in steel business is no longer confined to a few products; it is now noted on some products that had recently been lagging the worst. Hot-rolled sheets and strip, cold-finished bars, and some types of alloy steel, though still in good supply, are starting to make a quick comeback.

### SOME BUYERS NIPPED BY SURGING MARKETS — P. 208

Boom in sheet products is catching some tardy buyers with their orders down. Delivery times stretching out fast. Mills struggle to reserve space for old-line automotive customers in filling first quarter books.

### SHIPMENTS CUT ZINC STOCKS 23,000 TONS — P. 214

Smelter stocks of slab zinc plunged more than 23,000 tons during October, reflecting the heaviest shipments since Nov. 1952. Stocks now total 152,137 tons—still too high, but moving in the right direction. October production at 67,000 tons was almost back to normal after the strike. Greatest encouragement came from 14,000-ton rise in domestic consumer shipments and higher order backlog.

## NEXT WEEK:

### SALUTE TO THE WEST

Western growth since 1940 has been at a fantastic pace. In a special study based on extensive research, interviews and on-the-spot investigation, THE IRON AGE analyzes the past, present and future of western growth. "Salute to the West" contains special studies of the Pacific Northwest, the Northern California-Utah-Nevada area, the Intermountain States, the Southern

California-Arizona section. Detailed are the reasons for western growth and the factors that will keep it booming. There will be special articles on aircraft, aluminum, automotive and steel industries, and many charts showing how much faster the West is expanding than the rest of the U. S. "Salute to the West" gives the big picture of western expansion.

November 18, 1954

# The Furnace that Stirs Itself!

**ELECTROMAGNETIC PRESSURE  
CIRCULATES MOLTEN METAL**

— In this 60 Cycle —

**AJAX** TAMA-WYATT  
*Induction Furnace*

Heat is generated only in the melting channels. Controlled stirring (*neither too much nor too little*) guarantees uniformity of metal temperature and alloy composition and also leads to efficient melting of light scrap. Tiresome puddling is eliminated. The metal is held entirely in an inert refractory lining. The atmosphere is cool and free from contaminating gases.

**No Other Method  
Enables such Completely**

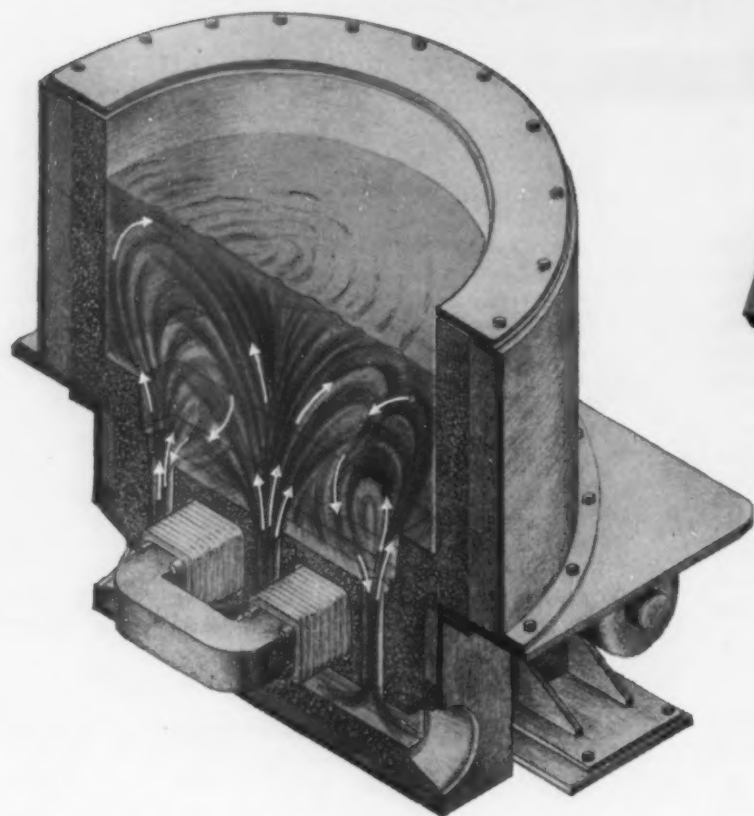
## CONTROLLED MELTING

Today, AJAX builds a complete line of these time-tested furnaces in standard sizes up to 333 kW for the dependable melting of aluminum, brass, copper and zinc. Units for special applications are carefully engineered to specifications.

## TWIN COIL INDUCTORS

### Lead Non-Ferrous Melting

The sectional view above shows the twin coil stirring action of the 100 kW Ajax-Tama Wyatt 60 cycle induction furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electromagnetic circulation as shown by the arrows. The 100 kW furnace shown here is one of a family of twin coil furnaces available today for melting rates from 300 to 10,000 lbs per hour.



**AJAX**

TAMA-WYATT



**AJAX ENGINEERING CORP., TRENTON 7, N. J.**

**INDUCTION MELTING FURNACE**

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies  
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces  
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace  
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

dear editor:

letters from readers

### Inventory Recession

Sir:

We are writing to inquire if it would be possible to secure about 50 copies of that darned fine editorial of yours "Is The Inventory Recession Over?" in the Oct. 14 issue.

We would like to send it out to some of our good customers whom we know are going to do just the thing that you are counselling so well against, for it seems that in our business nobody wants to order our tools until the day they want to use them. *C. A. Koza, Owner, Machinery Sales & Engineering Co., Pittsburgh.*

### Wanted: Bound Volumes

Sir:

Do you have bound volumes of THE IRON AGE available for subscribers who desire to include them in the plant library? *F. P. Gilligan, The Henry Souther Engineering Co., Hartford, Conn.*

We don't have any bound volumes available now. Perhaps one of our readers can help you.—Ed.

### Oxygen Generator

Sir:

Will you kindly tell us who manufactures the small semiportable oxygen generator mentioned in the newsfront of Oct. 28? We should like to have more information on this piece of equipment. *W. D. Price, Purchasing Agent, National Malleable & Steel Castings Co., Cleveland.*

The maker is Joy Mfg. Co., Oliver Building, Pittsburgh 22, Pa.—Ed.

### Salute to the South

Sir:

I teach a course in marketing and I am sure your publication's special feature "Salute to the

South" would prove to be quite valuable and interesting for these students.

If it is possible for you to do so, I would greatly appreciate your sending me a copy of the reprint. *H. E. Howell, Commerce Dept., Central Michigan College of Education, Mt. Pleasant, Mich.*

### Diamond Wheel Grinding

Sir:

On p. 35 of your Oct. 28 issue, there is an article headed "Diamond Wheel Grinding: 10,800 RPM" in which you refer to a new high speed grinder recently developed by a midwest firm.

We would appreciate it very much if you would let us have the name of this firm in order that we may write them for further details. *W. H. Hunt, Purchasing Agent, Nicholson File Co., Providence, R. I.*

Further details may be obtained from the Aircraft Tool & Machine Co., 14800 Miles Ave., Cleveland, Ohio.—Ed.

### Gear Life

Sir:

At your earliest possible convenience, would you please send us two copies of the article, "Induction Hardening Improves Gear Life—Shortens Heat Treating Cycle," pp. 93-96, in the Aug. 26 issue. *N. L. Langer, Vice-President, Metallurgical Service, Inc., Dayton.*

### Titanium

Sir:

Please furnish us with two copies of the article entitled "Titanium: Shaping a New Industry," which appeared in the Sept. 23 issue on pp. 65 and 66. *G. H. Carney, Purchasing Director, Electrode Div., Great Lakes Carbon Corp., Niagara Falls, N. Y.*

What does  
"S. B."  
mean to you?



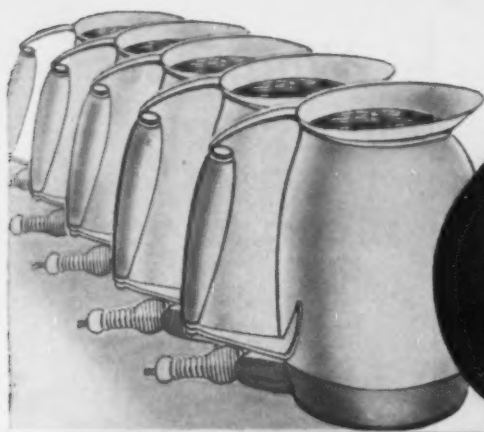
To some, it means Strictly Business. To others, it means a "Secretary-Boss" relationship. But, to thousands who want smooth-running machinery, it means Small Balls... Small Balls by Universal... true-to-round, even when they are no larger than a mustard seed.

We make them up to 1" in diameter in chrome, stainless, bronze, solar, aluminum, and special materials. Customers say they are Sure Better.

**Universal  
Ball co.**

WILLOW GROVE  
MONTGOMERY CO., PA.

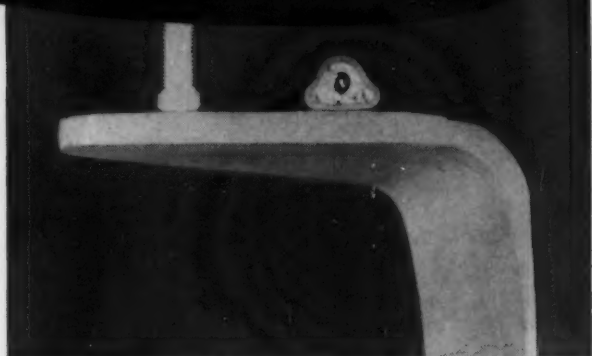




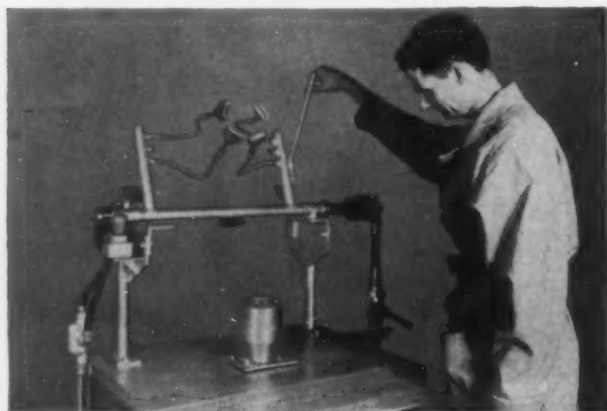
# SELAS THERMO-AUTOMATION *BRAZES THE WAY* TO 400% MORE EFFICIENCY IN ELECTRIC UTENSILS



**LARGER CAPACITY APPLIANCES** with faster response to thermostatic control can now be built for conventional kitchen outlets with the new Selas method of brazing aluminum—sheathed heating elements directly to aluminum utensils.



**PRECISION HEAT CONTROL** assures rapid, uniform and efficient brazing, without annealing utensil sidewall. Solid metal path for optimum utensil heat flow is evident in section view of utensil-bottom. Stud for mounting thermostat element is brazed simultaneously.



**RAPID BRAZING CYCLE** of only 30 seconds gives high production rates...with semi-skilled labor... gas-air fuel costs of only 1/10 cent per utensil. Brazing machines are semi-automatic (as shown) or fully automatic to meet production requirements.



**400% MORE EFFICIENCY** is built into Tricolator's electric carafe with the new Selas brazing technique... which is also used by other leading appliance manufacturers in producing deep-fat fryers, casseroles, skillets, and roasters. Write for informative article on Utensil Brazing.

• • • • •

Selas Thermo-Automation is the key to improved efficiency wherever you use heat for processing. In the steel, metal-working, chemical, ceramic and virtually every industry, Selas Engineers can design heat processing equipment to help speed production, improve quality and reduce manufacturing costs.



# SELAS

CORPORATION OF AMERICA  
PHILADELPHIA 34, PA.

Heat Processing Engineers for Industry • Development • Design • Manufacture

## fatigue cracks

### Monkey Business

Remember reading a book once. It was about how some parts of our anatomy down through the ages have become complete parasitic anachronisms through disuse. Like the appendix that used to be good for something and now only keeps Blue Cross in business. Or how one little portion of the ear lobe used to twitch to warn us of dinosaurs but doesn't twitch any more. Many people in the know even predict that our legs some day will be about a ft long and our whole body will be 90% head and sternsheets.

If this happens you can blame a lot of it on the automotive manufacturers, who each year seem to go out of their way to make one more functionary part of the body unnecessary. Take the new Lincoln. You don't even push a starter button anymore, either with finger or foot. She starts by merely shifting the gear lever to the neutral position—eliminates pressing a button completely or turning a key. This is called a "Startmaster" and could well be blamed when we wake up some day with only 4 digits to a hand per person.

We consulted Managing Editor George Sullivan about this whole thing and he said "Golly Gee!" which is true, of course, but unsatisfying. So we went to Dick Raddant, our automotive editor, who knows everything new about the industry and he wrote us this letter from Detroit where he is strategically placed to keep an eye on such things.

Dear Bill:

You probably remember that I sent you a report earlier this year on an interview with Evelyn Ay, Miss America for 1954. She has now passed into comparative oblivion, as you know, with Miss Ann Meriwether holding the title for 1955.

by William M. Coffey

While I haven't met Miss Meriwether yet, I have every confidence of doing so. Since she is more or less the promotional property of Nash (American Motors), it is more than likely that in covering the auto industry our paths will cross.

However, there already is an automotive and metalworking angle on Miss Meriwether, which I can report in advance of any personal contact.

When GM's Motorama hit San Francisco last March, she was one of a group of girls hired to man a miniature assembly line producing radiator caps. Apparently GM talent scouts failed to realize her potential and she passed from view, at least as far as the auto industry is concerned, until she won the Miss America title.

Hope this answers your question.

Regards,  
Dick Raddant

### Puzzlers

The distance between the buildings (Oct. 21 Ladder Puzzle #35876X) is 58.4596 ft. Winners: Beedle Bailey Rector, Fred P. Boulais, Walter L. Havekotte, Joe White, H. A. Granelli, C. McKinley and Charlsie, Dale Letterman, George Snyder and N. P. Stauffer, Jr.

### New Puzzle

Two girls hold a jumping rope so it just touches the ground. They hold the ends three feet from the ground and four feet apart. How far back must each girl move (in inches) so the rope will be just six inches off the ground when held at the same height?

Mr. Clarence P. Salmon, Bellows Engineer with Flexionics Corporation, Elgin, Ill., tosses this puzzle to the pack for which we say merci gracias.

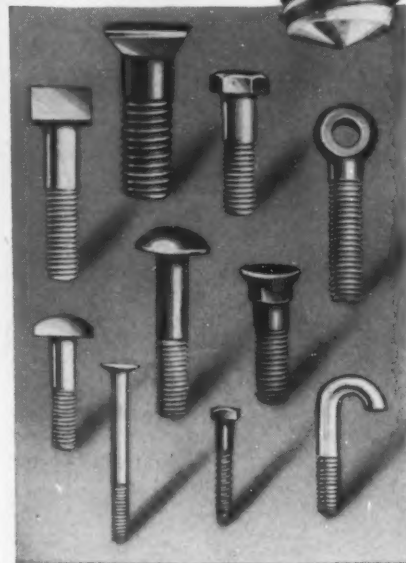
## Threaded Specialties

lower cost  
**EYE BOLTS**  
by an  
exclusive method

Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket eye bolts are made in standard sizes 1/4" and larger, or to your specifications. In any size, you can depend on uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

**PAWTUCKET**

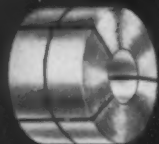
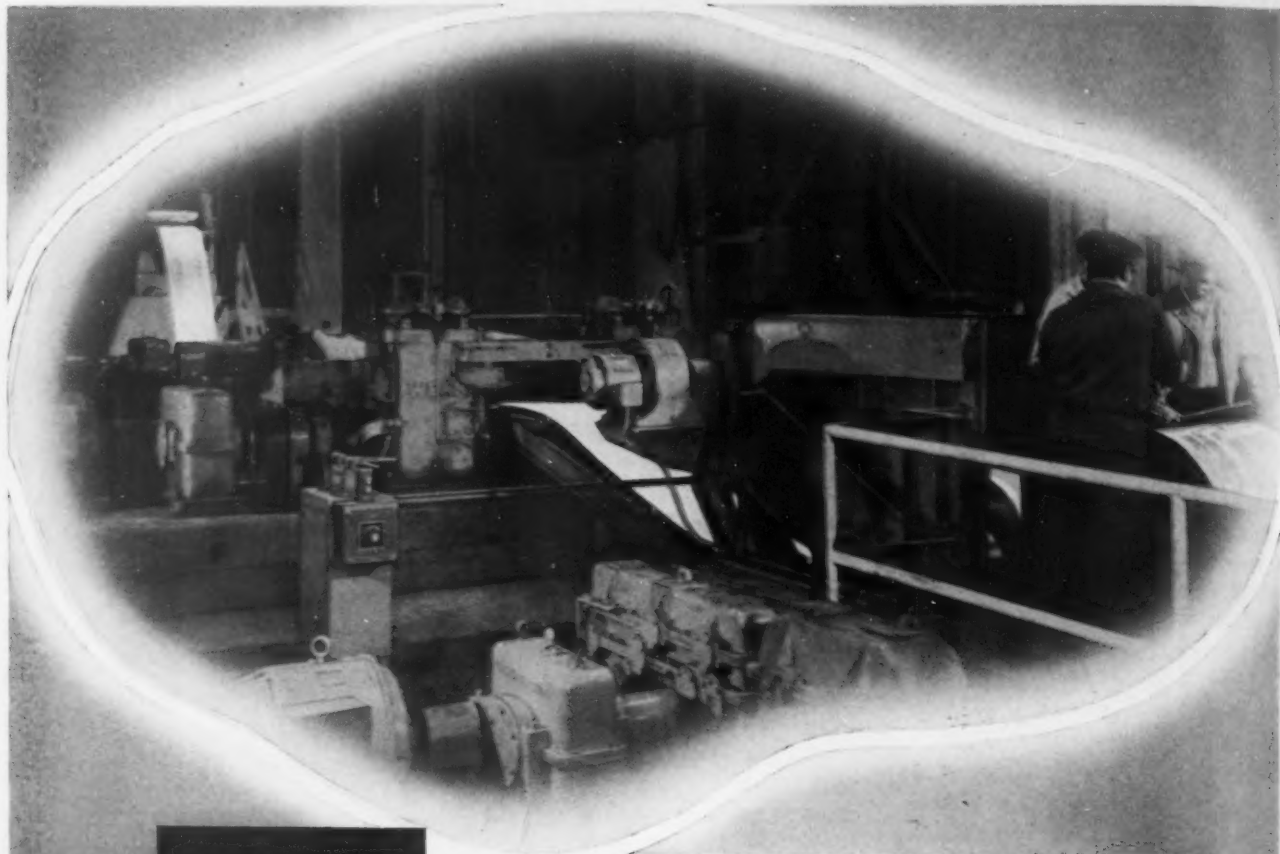
MANUFACTURING COMPANY

327 Pine St. • Pawtucket, R. I.  
THE PLACE TO SOLVE YOUR BOLT PROBLEMS  
T.M. REG.

"The Bolt Man"

# A.W. CONTINUOUS MILL

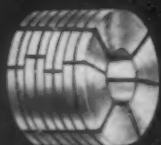
PLATE • SHEET • STRIP—available in hot rolled quality



Maximum Width  
trimmed coil



Bundle showing  
2 widths



Bundle slit to  
4 widths

More than  
a century and  
a quarter of  
iron and  
steel making  
experience

This new pickle line is a good example of the modern equipment used by Alan Wood in producing the highest possible steel quality.

Precision equipment such as this, and our policy of mine-to-mill undivided responsibility are your guarantee of always getting exactly what you want. The Alan Wood Continuous Mill produces steel from .059" to .500" to a maximum width 25½ inches, and is available in coils or cut lengths.

Our Eastern location, close to transportation, also means faster delivery . . . and often lower freight rates.

**ALAN WOOD STEEL COMPANY**

CONSHOHOCKEN, PA.



## The Iron Age Newsfront

### Al 26: Half-Life 1 Million Years

A recently isolated radioactive isotope, aluminum 26, is reported to have a half life of about 1 million years. Stability of the basic isotope will make possible isotopic studies of aluminum properties, how the metal is formed, and chemicals based on aluminum.

## Arms Spending: Missiles' Futures Going Up

Expenditures for guided missiles in 1955 are expected to top this year's \$500 million mark. Limited production on a new long range surface-to-surface missile is being planned for the near future. The new missile, Redstone, complements the Army's battlefield missile Corporal and the anti-aircraft missile Nike.

## Automotive Trends for '55

Look for forged aluminum wheels on one deluxe model car. Forged aluminum disk wheels may also be on some trucks. . . . Torque converter with a variable pitch stator will be the big automatic transmission story. . . . A trend away from wire wheels is noted.

## Ceramic Fan for High Temperature Use

A ceramic fan with long operating life at 2500°F is only one of the many engineering problems encountered and solved in development of a successful high temperature furnace. Success of the furnace depends largely on the ceramic fan.

## TV: Salesmen Meet the Models

Use of closed TV circuits has come of age in the auto industry this season. Almost every automaker has used this medium to bring the general manager and sales manager to regional meetings for pre-introduction pep talks for 1955 models.

### Problem: Lead In Alloy Scrap

Lead in alloy scrap for electric furnaces is becoming an increasing problem for some steel producers. Tightened specifications are being considered. Stainless scrap for one leading firm

has a lead tolerance of 0.003 to 0.005 which may shortly be tightened to flat 0.003 maximum.

## Plan Car Sales to Employees

Competition will watch with keenest interest the results of Chrysler's campaign to sell its cars to its own employees. Workers have been taken into the Corporation's confidence on forthcoming developments and impressed with the effect of new car sales on their own futures.

## High Speed Movies Solve Design Problems

High speed motion pictures are being used as a basic tool in the design of hand and cutting tools and in manufacturing problems by a major tool manufacturer. In one case high speed motion pictures revealed why a router was giving poor finish. Once the source of the trouble was known, redesign was simple.

## Vacuum Melted Alloy Stronger

New vacuum melted nickel-base alloy now being used in blades for a centrifugal-flow turbo-jet engine, has been found to stand up much better under the severe stresses of high temperature than earlier materials. Alloy uses more than 50 pct nickel plus chromium, cobalt, molybdenum and small amounts of titanium and aluminum for stability and hardness.

## Heavy End Strengthens Tubular Parts

Thin-walled steel tubular parts are now being produced with integral ends by resistance gathering. The method makes it unnecessary to provide excess material in a tubular member to obtain strength for welded or mechanically attached end fitting. The method has been used with carbon, alloy and stainless steels.

## More Producers Blast Steel Clean

Increasing difficulty in disposing of spent pickle acid plus the troublesome and costly job of removing fumes from the pickle building have directed considerable attention to blast cleaning by modern steel mills. At least 20 different steel companies are using mechanical blast cleaning.



**WE HARNESS  
UNSEEN  
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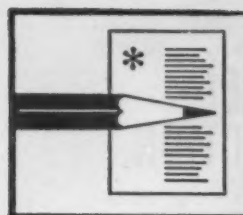
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**THE ELECTRIC CONTROLLER & MFG. CO.**

2698 East 79th Street

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## BUSINESS: Things Look Good for 1955

**Economy swings upward . . . Recovers from cutbacks, summer shutdowns  
... Inventories trimmed too much . . . Predict 106 million ton steel output next  
year . . . Machinery outlook good—By T. C. Campbell**

♦ THE RECESSION that wasn't there is over. It was over several months ago but an extended vacation in thousands of plant shutdowns this summer delayed the forward march. After more than a year of inventory paring the buying pattern has been reversed. After 18 months of soft pedaling defense buying, our government has stepped up placing of defense orders.

Heavy industries were curtailing inventories and cutting down on expenditures — but consumer spending changed very little. It was supported by wages, unemployment payments, old age assistance checks, savings and expansion of credit. The consumer refused to see the past year as a recession or a depression.

Powerful forces will be superimposed upon already bullish business factors as a result of the recent election. These injections are some of the ones the professionals in the Administration expected to use more leisurely before the storm warnings went up after Nov. 2.

There are six major factors which together spell industrial activity next year close to the 1953 level. Here they are:

**Seasonal Factors . . .** Something new has been added to this contribution this year. Along with the usual fall pick-up has been tremendous activity in the automotive field, compensation for downtime this summer, and a strong buying reservoir among workers and salaried people. Seasonal fac-



Editor Tom Campbell getting the dope on the business outlook.

- Why is business going to be good in 1955 and 1956?
- What major factors are now contributing to sudden recovery?
- Why are many businessmen who were pessimistic a few months ago now talking about expansion, forward buying?

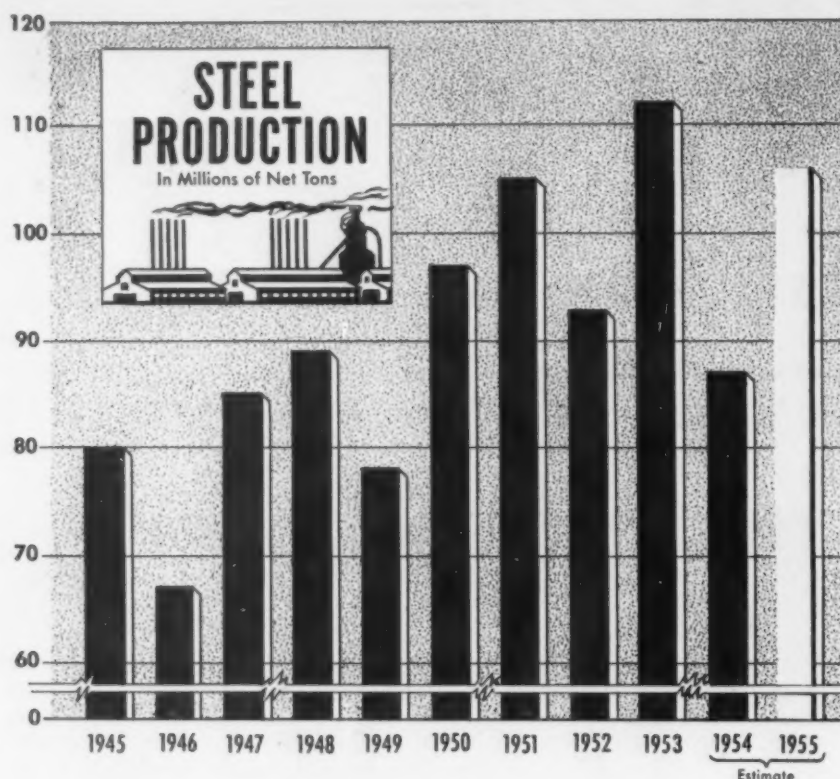
To get answers to these questions, Editor Tom Campbell talked to many people in industry, got views of the man on the street, reviewed intimate experience with metalworking markets and prices.

Putting it all together, he comes up with some exciting predictions for 1955. Some of this information—a pretty big slice of it—is the kind of talk you have with your partner or a good customer when you think no one else is listening.

Thirty years of first hand experience in metalworking, plus a proven knack for calling the turn in business, add authority to Mr. Campbell's predictions.

November 18, 1954





tors will push indexes and other business measuring devices higher than expected during the final 2 months of 1954 and first quarter 1955.

**Recovery Phase . . .** The business pickup is starting from a good solid foundation. Inventories had been cut back so far many manufacturers were depending on their suppliers to furnish material within 2 or 3 weeks. Metallic inventories were cut back too far—not only by steel company customers but by steel firms and warehouses. So on top of seasonal influences we have full domestic recovery now underway. It promises to boost demand, tighten supply and give great support to durables and semi-durables markets.

**Defense Buying . . .** Defense buying started to pick up in June. By buying we mean actual order placing, not payment with United States Treasury checks—those come from 1 year to 18 months after orders are placed. September was one of the biggest defense order months since January 1953. But there were other orders placed in June, July and August.

Many more are coming next year. It is now the policy of the Administration to raise its sights on defense appropriations for the fiscal year 1956—which begins next July. And there are other factors which will influence a heavier defense program:

- (a) Increase in the number of Army divisions to 23 or 24. Even though these may take less men in the beginning, they will eventually take more men than are now in the current 19 divisions—and they will take more arms and equipment.
- (b) There will be facelifting and expansion for the Navy, probably in the form of new aircraft and submarines plus revamping of destroyers and carriers.
- (c) Military aid to Indochina will continue. More aid to South Korea, Formosa and Japan must come sooner or later, probably sooner. Spanish installations will be speeded as a hedge against a possible stalemate of German rearmament.
- (d) Much U. S. material avail-

able for German rearmament is obsolete. The Pentagon's realistic approach of bringing everything up to date will include the whole German rearmament program.

#### Buying Patterns Reversed . . .

Hand-to-mouth buying pattern is over in the metalworking industry. If you don't believe it look at the steel rate, the machine tool order index, the activity in stamping plants, the pick-up in foundry business and the fresh approaches in the tool and die industry.

**Item:** A few months ago cold-rolled sheets could be had in 2 or 3 weeks. This week many firms are picking and choosing their cold-rolled sheet orders for first quarter delivery. Other steel items such as bars, manufacturers' wire, certain structural items and some plate are much tighter than they were a few months ago.

Wise purchasing agents have been buying ahead since early October. Others are now catching on. This means that just as the multitude went out of the market more than a year ago so has the multitude come into the market now.

**Item:** Warehouses—supposed to supply people who find it hard to get steel from the mills—let their own stocks get too low.

**Result:** They are now lined up to get steel from the mills which in turn let their stocks get too low.

**Farm Buying Up . . .** Farmers are spending more money. Part of this is due to last June's rainfall, built-up demand for farm implements that couldn't be put off any longer and a slight pick-up in total farm income. How does this affect you? Here's how:

- (a) The rainfalls on farms that haven't seen rain in 3 years have lifted the confidence and buying power of rural areas.
- (b) The farmer buys wire, nails, sheets, farm implements, trucks, passenger

cars and barnyard materials handling equipment.

- (c) These purchases find their way back to the manufacturers—many of whom have violated a basic business law: "Never run out of items which your customers want when they want them."
- (d) Farm purchasing is an added plus in the current recovery program. It has already registered an impact with farm implement people and wire manufacturers. It will register a strong impact on 1955 cars and trucks.

**Political . . .** The professional politicians among the Republicans will find it necessary—or expedient—to take the wraps off projects involving "things for the people." Emphasis will be on what has already been done but more emphasis—and action—will be applied to coming events. Some of these are bound to be:

- (a) A speed-up on the 10-year \$100-billion road building program. This is not only necessary for the country but will be a beautiful vote-getter for the politicians.
- (b) Defense items which were an absolute necessity will be pushed up in the picture. In addition to those mentioned above, more action will be taken on continental defense setups.
- (c) The rash of Democratic governors definitely spells a pick-up in spending for state roads, hospitals, schools and other state obligations.
- (d) The Republicans as a morale builder will have to get behind President Eisenhower's re-insurance plan for bigger and better health and accident coverage.

So much for the six basic factors, all of which will contribute to better business for you in 1955—and in 1956. Here are some spe-

cific side issues which will be big factors in domestic business:

**Steel Rate . . .** Production this year will be about 87 million tons. Next year the output will approximate 106 million tons. A wage and price increase is in the cards for 1955. Probably close to 6 to 8 million tons of steel will have been taken out of inventory in 1954 in order to keep manufacturing schedules going. This will be replaced in 1955. Tightness will extend to many more products than cold-rolled sheets. Some steelmakers are planning to expand, or at least modernize, finished steel capacity.

**Machine Tools and Machinery . . .** The machinery field is definitely in for a lift in 1955. It will get its support from cost cutting machinery, defense buildup, Ger-

man rearmament, general recovery and replacement.

**European Recovery . . .** One of the greatest industrial recoveries in years is now taking place in Great Britain and Western Germany. It is extending to the Benelux countries and there is ample evidence that American methods of mass production are being accepted and used in European countries. This is increasing consumption, wages, desires, and has extended installment buying where it never existed before. The one thing needed in Europe is more American management technique—and it is being used in ever-increasing volume.

All this spells a much bigger two-way traffic flow in exports and imports between the U. S. and Europe. That means more business for you.

## Checking the Inventory Factor

The peaks and valleys in the steel industry are higher and deeper than they are for the economy as a whole.

For example, at the low point of the economic dip in the first part of this year Federal Reserve Board index was off 10 pct from the 1953 peak, Gross National Product was off only 4 pct, and personal income was on a plateau.

But steel production was off nearly 25 pct, as consumers literally lived off the shelves. This was the much-talked-about inventory correction.

Now, in the past 3 months steel production has spurted an amazing 26 pct, while the above indexes have been trouging a steady course.

The same inventory factor which pinched the industry in 1954 will help it gain more than the economy as a whole in 1955.

While the steel industry will produce about 87 million net tons of ingots this year, it is estimated that consumption will amount to the equivalent of 94 million tons. The difference of 7 million tons has been drawn from inventories of consumers and producers, more than two-thirds of it from the former.

Inventories are now at rock bottom, as low as if there had been a steel strike. With steel deliveries becoming more extended, many consumers are finding their stocks have been trimmed too short for safety. So the only way inventories can go is up.

Inventory replenishment in the first half of 1955 will get an added boost from impending wage talks. The annual wage-price round, with strike or threat of strike, has taught many consumers that steel inventory is better than money in the bank at such a time.

It is not far-fetched to anticipate that as much as 5 million tons of steel may be used to replenish inventories next year.

Adding 7 million tons more the industry will have to produce to sustain 1954 level manufacturing consumption, and 5 million tons inventory replenishment, gives production differential of 12 million tons—all due to inventory factor.

This places minimum steel production for 1955 at close to 100 million tons, before allowance is made for increased requirements resulting from improved business of steel's customers.

## OIL GOODS: Offer New Pricing Plan

**U. S. Steel acts to meet rising competition in oil country goods**

**... Offer "in-transit" storage at barge terminals ... Charge barge rates plus local delivery ... Expect others to follow—By J. B. Delaney.**

♦ **ALTHOUGH** months behind other steel products, oil country goods are now a competitive market. Freight absorption is on the way—if not already here.

It's not that business is bad or that the oil companies are drilling fewer wells. Far from it. This year will break all records on the number of wells drilled. Estimate for U. S. and Canada is "over 51,000" compared with 49,000 last year.

Steel mills simply expanded themselves into a buyer's market. New capacity brought in by Colorado Fuel & Iron, Lone Star, and Republic adds up to 50,000-60,000 tons per month. In addition, other producers have increased their capacity.

### Take First Step

Customer is now in the driver's seat. He's got new capacity right in his back yard in C. F. & I., and Lone Star. He's got the new Republic facilities in Chicago. He can talk turkey to the large "eastern" mills in terms of delivered price and speed of delivery.

Initial step to meet these changing conditions was taken by U. S. Steel Corp. through its Oil Well Supply Div., which warehouses and distributes National Tube Div. products to the oil fields. What Oil Well Supply is doing will represent a saving to the consumer as long as he has to foot the shipping charges, and less freight absorption for National Tube when it is forced to meet the lower delivered price of a competitor.

### Won't Build Warehouses

Oil Well Supply announced it is arranging to carry selected stocks of oil country goods in "in-transit" storage at selected barge terminals. Price to consumer will be the "at

mill" carload price of National Tube, plus the 500-ton barge rate, plus 4 pct of the "at mill" carload price to cover handling. Customer also will pay the rail or truck rate from the barge terminals to ultimate destination.

National Tube explains that the tonnage stored at commercial barge terminals will be relatively limited. Storage cost will be nominal. The company has no intention of expanding Oil Well Supply warehousing space, nor does it contemplate constructing depots for maintaining heavy inventories convenient to the oil fields.

Instead, National Tube is converting the old Wood Works of U. S. Steel at McKeesport, Pa., on the Monogahela River near its McKeesport plant into a warehouse where heavier inventories will be stored. This material will be loaded on barges for downriver shipment as needed.

The move will shift considerable tonnage from the railroads to the barge lines. When the market was tight and capacity lower, many consumers were willing to pay higher rail charges to get delivery. Also, barge space was at a pre-

mium. They're available today. National Tube plans to use barges whenever possible.

### Others May Follow

Return of competition made Oil Well Supply's action inevitable. Although C. F. & I. and Lone Star have been charging a premium due to their location, the delivered cost to the consumer from eastern mills has been higher due to heavier freight charges. Also, the southwestern producers have been able to ship by truck direct to the well sites.

Other eastern producers are expected to follow National Tube's lead. Jones & Laughlin, which has its own warehousing system in the oil fields, is in a position similar to that of National Tube. But the situation is a bit different for producers like Pittsburgh Steel and Republic which distribute through independent jobbers.

### Aid Machine Exports

Fresh stimulus to the lagging machinery export trade is supplied in the extension of new lines of credit by the Export-Import Bank of Washington to the Oliver Corp., Peoria, Ill., and Combustion Engineering, Inc., New York, for the sale of capital equipment abroad.

A total of \$4 million is being made available to Oliver to aid in selling agricultural equipment overseas. Sum of \$6 million is being made available to Combustion Engineering to finance the export of steam boilers and related equipment.

Export-Import Bank guarantees payment of a portion of the obligations of foreign importers of the equipment, so that the obligations may be bought by commercial banks or institutions named by the exporter.

### Oil Country Goods

(Shipments in Net Tons)

1954*	1,230,187
1953	2,801,820
1952	1,610,000
1951	1,879,000
1950	1,693,000
1949	1,366,000
1948	1,536,000

\* First 6 months.



## OIL: Bigger Steel Customer in 1955

All signs point to continued growth on all fronts for petroleum industry next year . . . Refineries, drillings, pipelines expected to pass 1954 levels . . . Steel buying stays heavy—By K. W. Bennett.

♦ IF OILMEN have troubles, they are the kind more of us should have. Though entangled with government regulation of natural gas pricing after a recent court decision, though one element of the industry is battling for better tariff protection, though there's been talk of a petroleum products surplus through most of 1954—the 1955 outlook is uniformly bright.

**Refinery Expansion:** More and at least at the same rate as 1954. Business on the books suggests that the rate of the past three years will be sustained as petroleum chemical producers, refineries, and field processing expand. Six refineries are building, eight more are planned.

**Drilling:** Will probably exceed the record 1954 level of 207,000,000 ft by another 10,000,000 ft. Despite overproduction talk in 1954, the industry surpassed its 1953 drilling footage of 196,000,000 at a rapid walk.

**Line Pipe:** Slowing through 1954 and hitting a sharper slump at mid-year and through September, is expected to boost sharply in first quarter 1955. This move has already been presaged by an upturn in plate buying, particularly along the West Coast, and an advance of small linepipe orders in the West and Southwest.

**Offshore Drilling:** Doesn't use much pipe but does use a considerable physical plant per individual derrick. Quotations for a well drilling platform from one seller, \$350,000; for a floating well drilling rig, \$3,000,000. Yet according to Secretary of Interior

McKay last week, the first government call for bids on tideland property brought 326 bids on 97 tracts by 31 companies. A second sale last Tuesday was bringing \$2209 per acre.

**Natural Gas:** Has earmarked \$3 billion for expansion in the period 1954 through 1957. This includes wells and linepipe, storage facilities and distribution equipment.

**Canada:** Will move ahead strongly. Petroleum production rose by 25 pct in that nation during 1954, and \$1 million per day has been spent for oil development in 1954. On the books are plans for, particularly, further petrochemical and gas line expansions.

Said Standard Oil's John Boatwright at the Chicago meeting of the American Petroleum Institute last week, "... based on this (Standard Oil of Indiana) forecast, the oil industry in all its phases will from now on have to operate at higher levels than have been experienced during 1954."

His forecast: An advance of 4

pct in consumer demand for petroleum products or 7,279 barrels daily in crude oil runs to stills in 1955 as opposed to 6,997,000 bbl in 1954 and 7,000,000 in 1953. Though Mr. Boatwright hedged his forecast with caution, his verdict reflected a widespread optimism in the petroleum industry.

### Drillings Stay High

Linepipe and tank fabricators echo the sentiment. Though plate sales began to advance in September, it is only in the past two weeks that a growing rash of small linepipe orders began to suggest a positive upward movement in linepipe construction. This is not expected to gain real strength until January, but January through March should see a sharp upward movement in linepipe tonnages shipped.

At present, despite the slip that began in June and July, linepipe sales (as of Sept. 30) were at 81.1 pct of tonnages shipped in the same nine months of last year. Carbon plate dropped to 62.6 pct of year-ago sales in August and in September moved up to 64.6 pct of September '53 sales.

### Better Than Predicted

Despite predictions of a 20 pct drop in second half, drillings galloped through first half 1954 to reach 25,904 wells. In the second half, rather than dropping, they moved to 44,645 as of the end of October, compared with 41,041 completions in the same 10-month period last year.

Oil country shipments slipped in September. They are currently at 107.8 pct of shipments in September of last year, but average for the first nine months of 1954



"She may not be managerial timber, but she sprouts some nice limbs."



Multiple-part Red-Strand Slings handle heaviest loads, and are easy to apply to both the load and the crane hook. User tests in Detroit proved Red-Strand slings withstood unusual abuse, yet maintained higher-than-rated strength. A Gary plant uses Red-Strand single-part slings for many lifting jobs like this. These slings are available with various combinations of end fittings for attaching the sling to rings or lugs.

## How to Select the Correct Sling for Your Job

Start your sling selection by analyzing five factors:

1. The load—its size, weight, shape, finish.
2. Working area, amount of head room.
3. Size and type of crane hook.
4. Angle of sling legs.
5. Location and type of lugs or rings, if any.

From this information your supplier can recommend the sling by type, size and length that is safest, longest lasting and most economical for your job.

### Types of Slings

*Multiple-part slings* are always recommended for heavy duty service, because for equal strength they are far more flexible than single-part slings. They hug the shape of the load easily, present a greater bearing surface to the load, and reduce the possibility of marring surfaces.

Where these factors are not so important, either Red-Strand *single-part slings* or *grommet slings* may be used for economy. Single-part Red-Strand slings are often recommended for lifting lighter weight objects, or those that have fixed attaching rings or lugs. Grommet, or continuous strand Red-Strand slings are ideal for forming hitches of various types without fittings.

### Extra Savings

Two suggestions will help you save money on slings.

The first is to re-use Pin-Lock thimbles on multiple part slings. These exclusive Leschen Pin-Lock thimbles cut sling costs on an average of 21% because they may be used again and again. They lock into sling loops with pins instead of permanent clamps, permitting re-use, and eliminating constant expense of thimble replacements.

The second suggestion is to use Red-Strand slings because they are made of *higher-than-rated* quality Leschen wire rope that delivers *longer-than-expected* service.

Get a copy of Leschen's *Sling Handbook* for complete information. Ask your Leschen man for one, or write.

## LESCHEN WIRE ROPE DIVISION

The Watson-Stillman Company  
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)  
St. Louis 12, Missouri



When you re-use  
Pin-Lock thimbles  
you reduce sling  
costs by 21%

is 122.4 pct of shipments in the same nine months of 1953, until now a record year.

### Trim Tube Inventories

Though tube producers can offer almost immediate shipment, mills doing 20 turns a week aren't uncommon. No backlog, but capacity operation.

Ask a salesman about his customers' inventories of tube and he'll probably say, "They're loaded." Which is true, but it's also true that there has been a widening reduction in tube inventory since July, in expectation of a drilling rate drop that never came. With every indication that the drilling rate will increase—with the estimate for total 1954 well completions still advancing and now at 52,000 to 53,000 wells—the case and tubing market looks healthier today than it did two months ago when deliveries of tube were taking up to six weeks.

A few older hands at the American Petroleum Institute last week had to say of steel: "It's easy to get now. But it wouldn't take much to make this market tighter than the beginning of '53."

An industry that is rated third largest in the U. S. on a capitalization basis is beginning to flex its muscles. With oil country goods and linepipe consuming 6.9 pct of the nation's finished steel output, besides heavy tonnages of plate, the ripples of an oil industry advance will be widely felt.

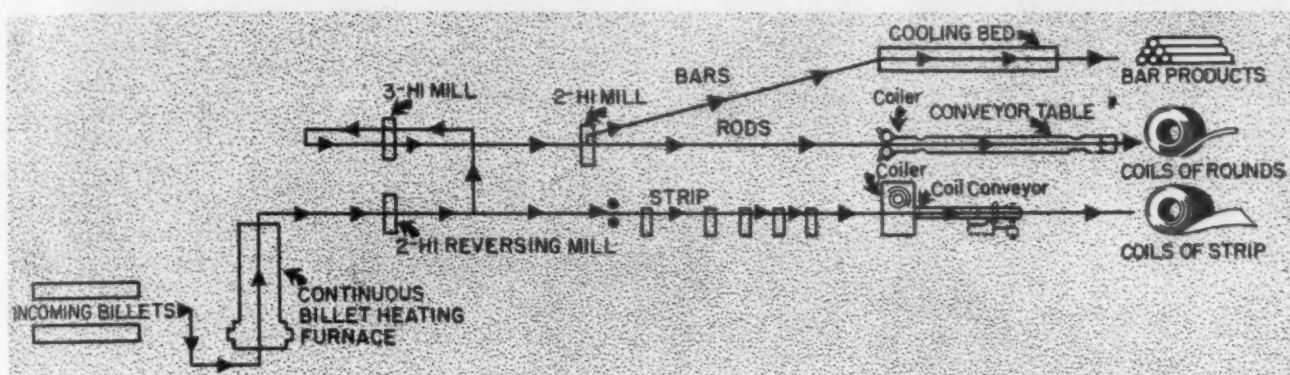
### Need More Aluminum

Defense Department and Atomic Energy Commission will require 70,000 tons of aluminum to be set aside from total supplies in the first quarter of 1955, an increase of 10 pct over the present period.

Officials say the increase reflects a change in military requirements, but not increased level of production. Total setaside will amount to 16 pct of domestic and imported supply, and will meet requirements of direct military end items.

## STEEL: Launch Versatile Hot Mill

Carpenter Steel Co. adds a new, high-efficiency, 3500-ton-per-month rolling mill at Reading . . . Unique stand layout permits quick change of products, sizes . . . Roll bars, rod coils, strip—By J. R. Whipple.



SCHEMATIC of Carpenter mill shows how products are routed from a single 2-high mill through finishing stands.

◆ ONE of the most versatile and efficient push-button type hot mills in the specialty steel field was formally opened at the Reading, Pa., works of Carpenter Steel Co. last week.

New mill, built at a cost of \$7 million, increases Carpenter's hot-finishing capacity by over 40 pct. Housed in a single building, 650 by 150 ft, the new hot mill supplements the company's existing separate facilities in rod, bar and strip mills.

### Has Quick-change Layout

A unique layout permits the mill to roll strip from  $\frac{1}{2}$  to 10 in. wide to a minimum thickness of 0.093; rod coil stock from  $\frac{1}{4}$  to 13/16 in. round; bars from  $\frac{3}{8}$  to  $1\frac{1}{2}$  in. round. In addition, the 20 in. 2-high reversing mill can handle up to 14 in. square ingots.

Mill's unusual flexibility stems from an arrangement of five finishing points—in contrast with conventional one or two—which permit size, shape and product changes with a minimum time loss. Stands are so arranged that they can be used as a train for bars, in tandem for strip, or cross-country and looping for rod. Design permits the rolling of one size while changing roll setup for the next.

Extensive use of automatic controls on rolls, transfer tables, coilers, etc., enables Carpenter to operate the new mill with a crew of 25 men per shift, contrasted with 70 men per shift needed to man the company's three existing hot mills. Productivity per man has been more than doubled.

Engineered maximum capacity of

the mill is 15-tons per hour of strip, 10-11 tons of  $\frac{1}{2}$  in. rounds for a total of 3500 tons of specialty steels per month. According to A. A. Britton, Jr., vice-president in charge of production, the mill is rolling up to 75 pct of capacity at present, will soon exceed that. Mill is designed to roll special steels with up to 80 pct nickel alloy, can roll titanium too.



EXTRA loops can be added to roll additional passes for smaller coil rounds.



## CUTTING OIL: Survey Industry Use

**New Iron Age market research study shows metalworkers consumed over 56.6 million gallons of cutting fluid last year . . . Straight ready-to-use cutting oil led in quantity, number of users.**

◆ THE METALWORKING industry consumed over 56.6 million gallons of cutting fluid in 1953, according to a new survey by THE IRON AGE Market Research Div. Over 1000 plants in 100 different divisions of the metalworking industry were queried as to kinds and quantities of cutting fluids used.

Replies were received from 1016 plants, with 902 reporting that they use cutting fluids on a regular

basis. (For expansion of sample to cover the whole metalworking industry, see large table.) Breakdown of the replying firms' answers showed straight, ready-to-use cutting oil the most popular. Breakdown worked out as follows:

Type	Gal.
Petroleum water soluble oil . . . . .	1,353,967
Chemical emulsion, water soluble . . . . .	449,388
Straight cutting oil (ready to use) . . . . .	4,230,925

Straight cutting oil bases (concentrated) . . . . .	509,344
Petroleum blending oil . . . . .	1,214,273

Ready to use straight cutting oil was not only used in greatest quantity, but also was reported by the majority of plants in a significantly large portion of the sample.

Of a smaller group queried as to cutting fluid for automatics, 167 preferred straight cutting oils, while 79 voted for water soluble oils.

### Purchases of Cutting Fluids by the Metalworking Industry in 1953

Gallons Purchased in 1953					Gallons Purchased in 1953				
S.I.C. Codes	Industry Groups	Water Soluble Emulsions	Straight Cutting Oil	Concentrated Cutting Oil Bases	Petroleum Blending Oil	S.I.C. Codes	Industry Groups	Water Soluble Emulsions	Straight Cutting Oil
19	Ordnance . . . . .	240,975	1,659,038	45,568	8,415	3567	Industrial Furnaces . . . . .	2,205	7,312
25	Metal Furniture . . . . .	42,372	90,845			3568	Stokers . . . . .	26,910	90,098
3411	Tin Cans . . . . .	1,784	1,487			3569	Other General Indus. Mchry. . . . .	14,267	52,243
3421	Cutlery . . . . .	43,648	179,080		7,964	3571	Computing Mches., Cash Registers . . . . .	23,234	39,874
3423	Hand Tools . . . . .	53,557	200,017	8,816	32,074	3572	Typewriters . . . . .	21,017	89,767
3425	Saw Blades . . . . .	54,075	6,300			3575	Vending Machines . . . . .	44,800	8,640
3429	Hardware . . . . .	63,536	537,096	21,160	90,992	3576	Scales . . . . .	4,536	2,052
3431	Sanitary Ware & Plumbers' Supplies . . . . .	120,060	261,622			3579	Other Office & Store Machines . . . . .	13,860	30,606
3432	Oil Burners . . . . .	11,997	94,299			3581	Domestic Laundry Equip. . . . .	63,623	91,845
3439	Stoves & Heating Equip. . . . .	450,275	97,751	24,868	20,178	3582	Commercial Laundry Mches. . . . .	6,020	2,450
3442	Metal Doors, Sash, & Trim . . . . .	42,952	63,159	401		3583	Sewing Machines . . . . .	21,640	14,040
3443	Pressure Vessels, Boilers, etc. . . . .	85,659	76,011	1,435		3585	Refrigerators, Air Conditioners . . . . .	209,363	89,226
3461	Vitreous Enamelled Products . . . . .	22,400	1,680	3,360	280	3586	Measuring Pumps . . . . .	42,000	127,660
3462	Automobile Stampings . . . . .	80,480	7,227			3589	Other Service & Household Machines . . . . .	154,434	76,062
3463	Stampings . . . . .	239,795	1,116,495	71,108	11,484	3591	Valves . . . . .	248,262	533,423
3471	Lighting Fixtures . . . . .	22,248	21,024	5,760		3592	Pipe Fittings . . . . .	24,668	884,512
3494	Bolts, Nuts & Rivets . . . . .	534,300	910,410	179,668	140,541	3593	Ball & Roller Bearings . . . . .	713,950	2,236,189
3495	Screw Machine Shops . . . . .	236,993	4,610,323	265,419	1,415,395	3599	Machine Shops (Jobbing) . . . . .	124,786	185,191
3499	Misc. Fabricated Products . . . . .	7,500	1,250			361	Elec. Motors, Controls . . . . .	412,444	822,813
3511	Turbines, Steam Engines . . . . .	101,250	16,500	16,500	41,250	3621	Elec. Appliances (N.E.C.) . . . . .	26,865	121,159
3519	Engines, Internal Comb. . . . .	401,006	627,903	281,400	88,085	3641	Elec. Equipment for Transportation Equip. . . . .	167,290	1,235,543
3521	Tractors . . . . .	104,685	511,350	5,407	5,250	3661	Radio & Electronics . . . . .	30,955	43,164
3522	Agricultural Machinery . . . . .	143,027	72,446	12,478	68,764	3664	Telephone Equip. . . . .	122	2,026,000
3521	Construction Machinery . . . . .	247,288	97,384	14,405	28,595	371	Motor Vehicles & Parts . . . . .	6,059,250	6,745,175
3532	Oil-Field Machinery . . . . .	140,983	93,960	23,968	54,114	3721	Aircraft . . . . .	125,632	422,280
3541	Machine Tools . . . . .	348,370	1,166,937	12,260	44,751	3722	Aircraft Engines . . . . .	463,518	221,520
3542	Other Metalworking Mchry. . . . .	228,403	197,812	66,954	2,768	3729	Aircraft Parts . . . . .	135,218	62,320
3543	Cutting Tools . . . . .	366,210	918,787	24,537	119,090	3731	Shipbuilding . . . . .	40,290	58,310
3551	Food Machinery . . . . .	109,554	216,980	48,792	33,934	3742	Railway Cars . . . . .	31,877	17,468
3552	Textile Machinery . . . . .	29,195	176,084	13,976	67,647	3799	Misc. Transportation Equip. . . . .	24,420	61,050
3553	Woodworking Machinery . . . . .	47,820	29,601	15,525	2,277	381-2-3	Instruments—Engng. & Mechanical . . . . .	63,305	293,266
3554	Paper Machinery . . . . .	22,488	13,848			384	Surgical & Dental Instruments . . . . .	9,902	30,719
3555	Printing Machinery . . . . .	71,556	288,252	2,040	8,100	3861	Photographic Equip. . . . .	1,192	11,272
3556	Foundry Machinery . . . . .	2,618	1,363			3871	Clocks . . . . .	1,023	133,650
3559	Special-Industry Machinery . . . . .	181,396	196,051	45,972	49,800	391	Silverware . . . . .	13,545	10,771
3561	Pumps & Compressors . . . . .	160,693	258,042	48,436	21,016	394	Toys & Sporting Goods . . . . .	9,917	18,010
3562	Elevators . . . . .	15,840	660			3951	Mechanical Pencils . . . . .	2,666	7,588
3563	Conveyors . . . . .	22,220	39,744						
3564	Blowers, Exhaust Fans . . . . .	13,804	21,284						
3565	Industrial Trucks . . . . .	35,500	33,625	70					
3566	Mech. Power Transmission Products . . . . .	467,820	258,957	50,715	134,067				
						Totals . . . . .		15,015,830	32,038,932

## TOOLS: East Germans Find Markets

**Red-controlled machine-builders offer a full line . . . Equipment is well-made but old-fashioned . . . Prices are lower, can be cut to serve political ends, beat any competition.**

◆ THE METALWORKING industry of the U. S. and Western Europe got a long and interesting look at its Iron Curtain counterpart via the recent Autumn Trade Fair in Leipzig, Germany.

Heretofore the Leipzig Fair had served only as a showcase for the metalworking industries of Communist-dominated East Germany. Models of machine tools were displayed, but as no orders were taken for them from either Western or satellite buyers reasonable assumption was that items displayed were mere prototypes, there for propaganda purposes.

This year East German toolmakers dropped their distant poses in favor of smiles, held order books, sharpened pencils and went for business in a big way.

### Show Quality Products

They had a lot to sell. Quality of materials and workmanship was very good—backed up by guarantees that items shipped would be exactly similar to the samples displayed. Contracts were written stating that an umpire's verdict of inferior quality will lead to adjustment or repayment.

Delivery times were short enough for most buyers; hardware and tools 6-8 weeks, radial drills 12-14 weeks, boring mills 10-12 weeks. Prices were very competitive—lower in most cases.

Designs of these machine tools are old-fashioned; in automatics the East German "people's plants" have reached a level of design comparable to models released in 1948-50 in the U. S., Switzerland and other Western countries.

However, this design lag didn't dampen the enthusiasm of too many buyers. In many sections of Europe, machinists and metalworking plants prefer older, less

complicated machines, are reluctant to switch to modern, automated designs. Price is a great persuader in these markets and a healthy saving often outweighs advantages of a faster, smoother-working machine.

It's impossible to peg even a vague range for costs of tools made in state-owned East German plants. West German toolmakers feel that they must of necessity be higher due to known factors such as obsolete plants and equipment, higher prices of raw material, smaller output, etc.

These Communist-controlled plants have flexible prices not only on machine tools but for containers, cranes, prefabricated buildings, enamelled hollowware, many other products. The prices charged for an item may differ from week to week, from one buyer to the next. Red-bossed industry of East Germany uses price as a political weapon, deliberately disregards the traditional relationship between cost and selling price. If the

buyer is from a country (Uruguay, for example), where the Reds are anxious to make a favorable impression, a milling machine may sell for 10 pct less than the price quoted to an English buyer the same day.

### They Want In

Politics is not the only factor—getting a toehold in the market outweighs the necessity of breaking even. A heavy-duty 42-in. lathe is listed at 12-14 pct below the price of an equivalent English lathe. However, the British machine will be newer in features, more efficient. If the buyer points this out to the East German agent, a 10 pct cut is forthcoming and will probably renew interest, consummate the sale.

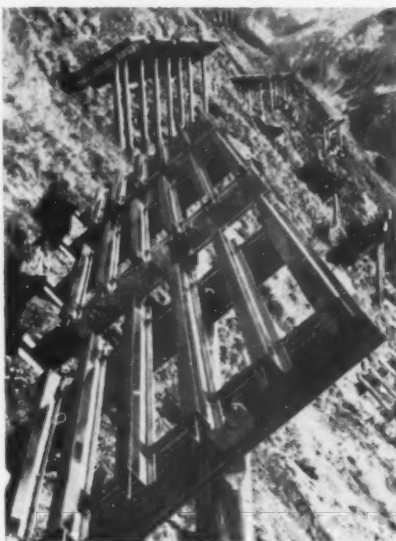
Result of this "make-'em-happy" price policy is that East German toolmakers are getting a healthy booking of orders from Central American countries, the Near East, Indonesia, and Japan.

### Trade Via West

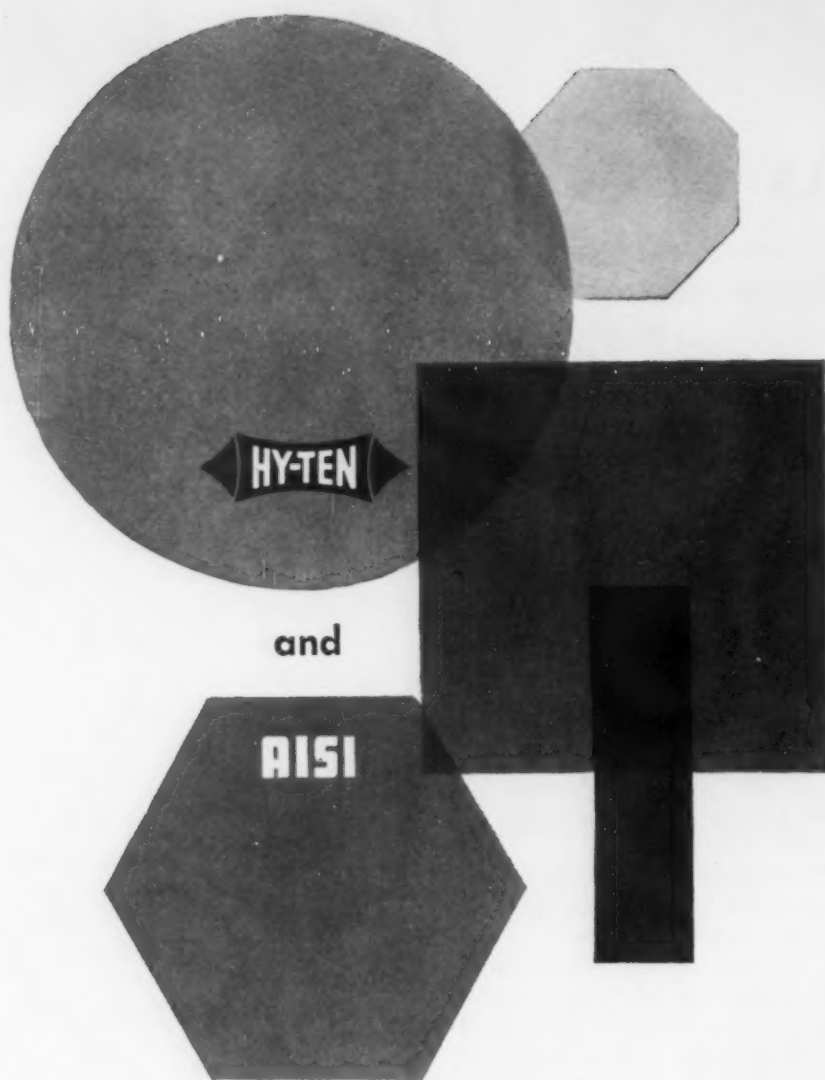
Also products of the East German metalworking industry are filtering into Western Germany in substantial quantities, thus balancing the highly unofficial West-to-East trade that's been going on for years.

Reason for the trade—East Germany lacks trade agreements with many foreign countries, has found West Germany a profitable avenue to otherwise unreachable markets.

East German manufacturers continue to buy the newest and best equipment available from Western European and U. S. machine tool firms. Paradoxically, these manufacturers behind the Iron Curtain want the very latest in automated tools to aid in pro-



ALUMINUM barriers set up in Swiss Alps in an attempt to stem avalanche damage.



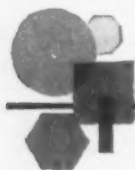
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**126 Sidney Street, Cambridge 39, Mass.**

## INTERNATIONAL

duction of "old look" machinery for less discriminating and more cost-conscious markets.

## Europe:

**Germans chafe under Schuman  
Plan restrictions.**

There are fears in Europe concerning the future of the European Community for Coal & Steel. The movement towards European integration has suffered a severe setback due to veto of the European Defense Community. And ECCS, it is felt, must overhaul its machinery, operate with new vigor if it is to remain a potent factor in the economic and industrial life of the six nations whose interests it was formed to promote.

### Criticise Authority

There is growing criticism in Germany of ECCS's High Authority and the end of the Community has been forecast by Dr. Dehler, head of the Free Democratic Party, one of Chancellor Adenauer's coalition parties. Western German coal and steel men do not necessarily take this view, but they believe that Germany must stop making concessions, that the High Authority must change some of its policies after two years' experience. The steel industry feels Luxembourg is too bureaucratic. Opinion of the Ruhr mills holds that there is no point in a huge new bureaucracy to regulate prices; pre-war cartels did that much more simply and efficiently.

### Seek Sales Aid

German steelmakers feel that in return for giving up national control over their great assets—Ruhr coal and steel—something must make ECCS more successful from the German standpoint. The big change demanded is that the High Authority concern itself less with policy questions, concentrate on economic problems of the coal and steel industries, particularly sales promotion.

However, despite their criticisms, the Ruhr managers, like the Bonn politicians, don't want to jeopardize European unity.



## FOUNDRY: Investment Casting Growing

Industry had only handful of shops in early '40's . . . Now well over 100 companies in field . . . Stainless leads output . . . First half business under '53, but now moving up . . . Outlook good—By K. W. Bennett.

♦ **INVESTMENT** casting, the forming of baked molds around wax "investments" to achieve highly accurate dimensions in castings, quietly came of age two weeks ago. The Investment Casting Institute announced its second birthday.

For an industry that could number its members in a one-man finger count in the early 1940's, the advance has been spectacular. About 90 pct of the industry has come into being since 1945. The average firm, among the 100-plus companies now engaged in this high precision type of casting, came into business somewhere between 1945 and 1950, has 10,000 sq ft of working space, numbers about 50 employees, and required an initial investment of \$100,000.

### Stainless Leads

An investment casting (as late as the early 1940's the dental industry was almost the only consumer) utilizes a wax or plastic pattern. A mixture that is most commonly equal parts of 20-mesh grog, 80-mesh silica sand, and 200-mesh silica flour, is poured around the wax "investment" which is then melted and burned out, leaving a hard, precise sand mold.

At present about 25 pct of investment castings output is in stainless steel with aluminum second by a close 21 pct, and copper, iron base and high temperature alloys following in about that order. These by no means represent the total range of metals used in investment casting. Almost any metal in commercial use has been poured, either on a production basis or experimentally. Average investment casting pro-

ducer has capacity to pour 100 lb of metal per hour or 100 molds per day.

### Output Recovers

Though business has been good since 1950, Investment Casting Institute officials report that 58 pct of investment casting producers are still rated as at \$100,000 or less capitalization. And while output is still slanted strongly toward national defense output, a growing civilian order book and the appearance of a scattered handful of captive investment casting shops indicate that the customer base is spreading. That the pace has been good is evidenced by the fact that something less than 10 pct of the companies

in this field are now rated at more than \$1 million capitalization.

Estimates among producers suggest that overall investment casting fell between 10 and 15 pct below 1953 during the first half 1954. But with output currently moving up, it is regarded as a fair bet that production next year will again be at the 1953 level and could conceivably surpass it.

With the electronics and aircraft industries as bulk markets for investment castings, any advance in defense expenditures would be bound to affect investment casting volume in 1955. But at least part of the advance will no doubt represent an increase



**SAFETY** chairman of Steel Founders' Society of America, E. M. Layman (right), accepts National Safety Council award for society's safety program from E. C. McFadden, vice-president for industry of the council, while F. Kermit Donaldson, Steel Founders' executive vice-president, watches at left.

Heavy Steel-Plate Baking Pan



## SHEET METAL FABRICATION

by

**KIRK AND BLUM**



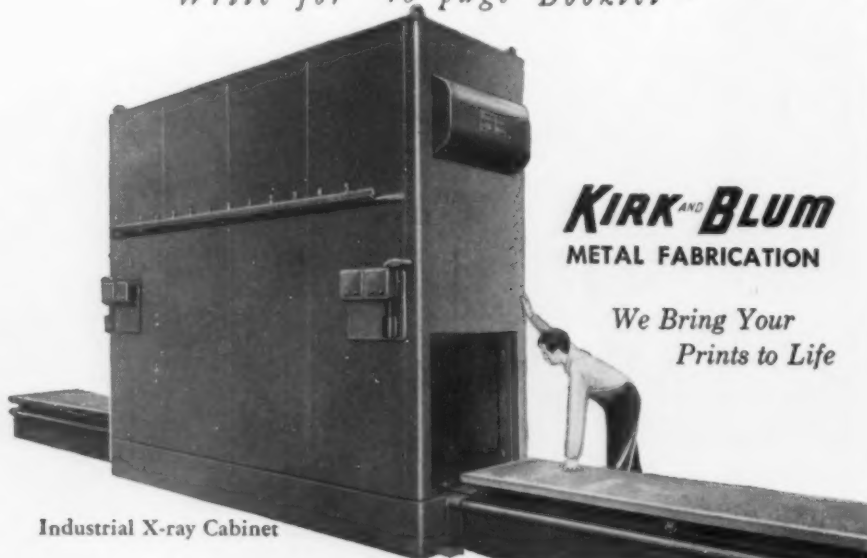
Drawn Steel Pans

There are no limits on size, quantity, shape or intricacy at Kirk and Blum. With 47 years of experience, Kirk and Blum meets your requirements in sheet, plate and alloy fabrication quickly and economically.

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## MANUFACTURING

in the civilian customers manufacturing lists.

In a recent address at Chicago, E. G. Chapman of Misco Precision Casting Co. advanced the principle of standard maximum tolerances, an idea that could wipe out a great deal of customer confusion and one that suggests an unexpected maturity in an industry this young. He suggested that standard casting tolerances per linear in. be set at  $\pm 0.003$  up to 0.25 linear in.;  $\pm 0.004$  at 0.26 to 0.50 linear in.; 0.005 per 0.50 to 1.00 linear in.; and  $\pm 0.005$  for each linear inch over 1.00 in.

### Probe Degassing

While degassing continues a tough problem, titanium is being cast under protective atmospheres and Naval Research is reported working with a crucible under a bell-jar-vacuum-pump arrangement. Though the latter is certainly not an economic method, it suggests that further experimentation may produce some answers to the hydrogen stagnation that occurs at a melt surface under some types of protective atmosphere melting.

As K. M. Bartlett, Thompson Products, Inc., stepped down from its presidency last week to take a board of directors position, the Investment Casting Institute and its members appeared well along the road from their one-year start.



"Go to WHERE?"

## AUTOWORKERS: Spell Out New Demands

**UAW starts wage conference . . . Guaranteed annual wage at head of list of demands . . . Will ask a 10¢ per hr wage boost . . . Set 2-yr limit on future escalator-improvement contracts—By R. D. Raddant.**

◆ LATE last week the auto industry got the full word on what the United Automobile Workers (CIO) will ask at the expiration of the historic 5-year contracts that have maintained labor peace throughout their duration.

An all-out push for the guaranteed annual wage was assured in recommendations of the International Executive Board made in Detroit at the UAW's economic and collective bargaining conference. While the 1000 delegates would hash them over, there was little doubt but that the Board's recommendations will be the rule when negotiations start only a few months from now.

### What They Want

In addition to the guaranteed annual wage, demands include:

- Wage increases of at least 10¢ per hour compounded by an increased annual improvement factor plus upward adjustments in the escalator formula.
- A limit of two years to future escalator contracts despite a UAW concession that the escalator-improvement factor wage formula "has proved its value."
- Improved pensions and other retirement measures.
- Hospital insurance and other health benefits fully financed by the company.
- In addition, a lengthy document on automation was introduced, indicating the UAW will make constant studies of "the problems associated with radical technological change."

The guaranteed annual wage proposal asks that new wage contracts guarantee that any worker with 2 years' seniority be employed the full year. Workers with less than 2 years seniority would

be guaranteed a week of work for every 2 weeks of seniority. This would build up to the full year's guarantee.

This plan is built around a guaranteed 40-hour work week for any employee called in on any specific week. This is aimed at preventing short work weeks which are customary in the auto industry in times of cutback production.

The guaranteed annual wage plan calls for the employer to assume the difference between the state unemployment compensation and a full week's pay for any laid off employee.

Further details of the guaranteed employment plan provide for its joint administration, financing through a combination pay-as-you-go and reserve trust with provision made for reinsurance.

In the complex wage demands, the union asks an immediate increase of 5.3¢ per hour, a figure the union says it is entitled to because of alleged deficiencies in

the current formula. However, Walter Reuther, UAW President, indicated a minimum of 10¢ would be asked. Upward adjustment of the improvement factor is included in the proposed demands.

Further wage adjustments demanded include transfer to base rate of the full amount of the cost-of-living float, a new escalator table reflecting a higher increase when the index moves up.

Security demands are increased pensions, removal of the 30-year ceiling, improved disability pensions, permanent pension rights, union voice in investment of funds, and improved eligibility rules.

Under the health security demands, the UAW asks a non-contributory financing of health security benefits. The union has previously contributed, usually about one-half.

Another point is time and a half for Saturday work, double time for Sunday, and triple time for holidays.

### Study Automation

While no specific demands were included regarding automation, the tone of the 12-page automation report indicates it will bear top consideration:

"The magnitude of the changes which automation will bring should not be underestimated," the report states. "Some problems will be solved across the collective bargaining table. Some will require that we join with other like-minded groups in the common fight on the legislative front. The union will continue to seek the enactment of socially desirable legislation that will give positive direction to technological change."



"I'll tell you who'd make a good boss, I'd make a good boss. That's who'd make a good boss."



## Freight Rates:

**Ask end to 10 year struggle  
for iron, steel traffic.**

Calling for an end to 10 years of "bitter struggle for iron and steel traffic" among competing forms of transportation, a Pennsylvania Railroad official last week urged the Interstate Commerce Commission to institute "a definite curb on destructive competition . . ."

Fred Carpi, vice president in charge of traffic, said the struggle for traffic has greatly depressed the rate structure without benefit to any of the carriers.

### Sacrifice Freight Revenue

He declared that "virtually unbridled strife" between railroads and between truck lines, and between common carrier trucks and contract truckers, has needlessly sacrificed freight revenues.

Mr. Carpi appeared as a witness in the Commission's investigation of rail and motor truck rates for hauling iron and steel in the territory generally east of the Mississippi and north of the Ohio and Potomac rivers, ordered when present rate levels were authorized last March.

### Need For Action

Mr. Carpi said there is need for the Commission to take constructive action. In addition to curbing destructive competition, he asked that the regulatory body establish for iron and steel traffic "a rate structure that will preserve the essential revenues of the carriers and at the same time permit traffic to move freely."

To correct "one of the by-products of this unfavorable development, instability and uncertainty," the witness recommended that the Commission provide "stability and clarity in the rate structure, so that all carriers, shippers and receivers of freight shall be in a position to ascertain legally applicable rates and carry on their business in an orderly way."

Mr. Carpi said that in his judgment "stability of rates is of almost if not the same importance as the rate level itself. It is impossible to conduct business in an orderly way without it.

"Equally disturbing," he continued, "is the present uncertainty as to the governing rates that may apply between given points. Some of the steel companies maintain large and excellently staffed traffic departments but, notwithstanding, they find it most difficult at times to ascertain the rates from competing shipping points," the Pennsylvania Railroad official stated.

### Follow Freight Cuts

Chrysler has indicated that it will follow Ford and GM in revising its transportation charges to far distant markets with an adjustment that will meet the competitive changes. New schedules have not been announced, but will come with the introduction of 1955 models.

### Backs Road Program

The Automobile Manufacturers Assn. has thrown its support behind President Eisenhower's \$100 billion 10-year building program for highways. The AMA recommends that the Federal government take over the full cost of building the 40,000-mile interstate highway system. For the past 33

years the automobile industry had supported a policy of limiting Federal funds to no more than 1/2 of construction costs.

### Launch Supercarrier

Launching of the *USS Forrestal*, the world's largest vessel, is now set for Dec. 11 at the Newport News Shipbuilding & Drydock Co., Newport News, Va.

The *Forrestal* is 1036 ft long. She has four deck-edge elevators, a canted deck to permit simultaneous takeoffs and landings, steam catapults, air-conditioned berthing quarters, an enclosed bow for improved seaworthiness.

About 90 planes can be accommodated on the *Forrestal*.

### Trucker Income Up

Motor freight companies in intercity service are proving consistent in the revenue gains they record.

As compiled by Interstate Commerce Commission, data on common and contract carriers' income show an almost unbroken climb during the years 1944-53. Last year, common carriers had revenues of more than \$3.9 billion, or nearly four times those for 1944.

Contract carriers registered intercity revenues of over \$358 million, as contrasted with about \$80 million in 1944.

### OBITUARY

#### Penton Chairman Dies

Earl L. Shaner, 64, chairman of the board, Penton Publishing Co.



Earl L. Shaner

and editor-in-chief, *Steel*, died suddenly Nov. 10.

Mr. Shaner joined Penton as an editorial representative of *Steel*—then *Iron Trade Review*—in 1916. He served as engineering editor, managing editor and editor until 1937 when he was named editor-in-chief and elected president of the company. Since 1949 he was board chairman.

Active in business paper journalism and publishing, Mr. Shaner was a past president, National Conference of Business Paper Editors, director, National Publishers Assn., past president, Associated Business Papers. He was a member of the American Iron & Steel Institute, American Society of Mechanical Engineers and the Cleveland Engineering Society.

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AGE



**HOT ASPHALT** pours into new Morania No. 160 barge. Double-hull construction and double heating coils are designed to maintain cargo at workable temperatures.

## Want to ship a 40-mile highway somewhere?

You could pave a two-lane highway from Baltimore to Washington with the hot asphalt this new steel barge can haul — and pave another three miles besides. Designed and built by Barium's Wiley Manufacturing Co., Port Deposit, Md., for Morania Oil Tanker Corp., the 240-ft. Morania No. 160 is now running from Baltimore, Md., or Barber, N.J. to points on the N.Y. State Barge Canal and ports on the Atlantic coast, principally moving asphalt of the American Bitumuls & Asphalt Co. It has made a big splash in maritime circles because

(1) it holds as much asphalt as 67 railroad tank cars and (2) it's the only asphalt barge designed to operate in both inland and coastwise service. What's more, on her first trip, the Morania No. 160 hung up a new record for discharging — 16,000 barrels in seven hours! However, full utilization of low-cost water transport also calls for strategically located terminals specially designed for heated bulk storage of asphalt. Here, too, Barium has the answer—Wiley can design, engineer, fabricate and erect new-design terminals under a turn-key contract. You can also see in this barge more evidence of Barium's "integrated opera-

tions". Wiley builds it, but Barium's Central Iron & Steel and Phoenix Iron & Steel supply plate and structural steel respectively. A long list of firms have learned to expect this type of joint action from Barium's 16-company team. We're saving a copy of "The Barium Story" for you, if you'd like to know more. **BARIUM STEEL CORPORATION**, 25 Broad St., New York City 4.

4.20



- |                           |                                |                            |                           |
|---------------------------|--------------------------------|----------------------------|---------------------------|
| BAYONNE BOLT CORP.        | CENTRAL IRON AND STEEL COMPANY | CHESTER BLAST FURNACE      | CLYDE IRON WORKS, INC.    |
| CUYAHOGA SPRING COMPANY   | EAST COAST AERONAUTICS, INC.   | ERIE BOLT AND NUT COMPANY  | GEOMETRIC STAMPING CO.    |
| GLOBE FORGE, INCORPORATED | INDUSTRIAL FORGE & STEEL, INC. | JACOBS AIRCRAFT ENGINE CO. | KERMATH MANUFACTURING CO. |
| KERMATH LIMITED (CANADA)  | PHOENIX BRIDGE CO.             | PHOENIX IRON & STEEL CO.   | WILEY MANUFACTURING CO.   |

## A SPECIAL REPORT ON PROTECTIVE FINISHES FOR ALUMINUM

Most aluminum producers and fabricators are well aware of the superiority of chemical finishes over anodizing for the protection of aluminum from corrosion. Naturally, then, there is a running battle for acceptance among the leading producers of the protective chemical finishes.

That's why, here at Allied, we have always studied your needs with regard to both our own and competitive processes. We're constantly trying to produce new and better finishes because we believe there's always room for improvement . . . even to our own products. Some years ago this policy led to the introduction of a process, long in development, that offered you a way to overcome anodizing's obvious technical complications . . . Iridite #14. This finish was far easier to use than anodizing, yet provided comparable, if not superior, quality. And, its cost was much less than anodizing.

But other finishes offering similar advantages over anodizing have entered the market. So . . . the current battle for acceptance. By any cost comparison Iridite #14 is the most economical. However, corrosion tests by users show contradictory results as to performance from Iridite #14 and other leading protective finishes for aluminum. Most tests show Iridite #14 superior, but some do not. The margin of difference, however, is always small. The truth is that all have proved good. However, our laboratory research indicated that still further improvements could be made.

That knowledge . . . plus our aim to give you even better protection and maintain the leadership of the industry, is exactly why Allied Development Engineers have been working for long years to develop a better finish than any of those now available, including our own Iridite #14.

Now the new finish is ready for you. It's called Iridite #14-2 (Al-Coat).

From a performance standpoint, Iridite #14-2 gives you two important advantages in the protective finishing of aluminum.

**FIRST:** in its fully colored brown film stage it provides corrosion resistance decidedly superior to previous processes.

**SECOND:** the basic brown film can be hot water bleached to produce a clear-type film with protection heretofore unobtainable from clear-type chemical finishes.

From an operating standpoint, new Iridite #14-2 gives you three important advantages.

**FIRST:** it provides consistently

higher corrosion resistance for different aluminum alloys treated in the same bath.

**SECOND:** it provides a more uniform appearance for parts of different alloys and with varied surface finishes before treatment.

**THIRD:** its operating and technical characteristics are superior to those of other processes.

If you are using or planning to use a chemical finish for aluminum, you should have full details on new Iridite #14-2. Write us or send samples for free test processing. Or, for more immediate advice, call your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book. - - - ALLIED RESEARCH PRODUCTS, INC., 4004-06 EAST MONUMENT STREET, BALTIMORE 5, MARYLAND.

P. S. Even new Iridite #14-2 will be constantly measured against both your needs and competitive processes to make sure you get the best possible, most economical finish for your product that man and the laboratory can develop.



## Report To Management

**There's been a lot of eye-rubbing** the last few weeks. People are finally beginning to wake up to the fact that we're off again—that the business pickup really is more than just a natural seasonal gain.

**What's probably caused most of this** surge of optimism is the spectacular rise in steel production (up 26 pct since mid-August) and the return of automotive strength—November car output may be about twice what it was in October and December production has an outside chance of being the highest for any single month in more than 4 years.

**But the tendency is still to under-**estimate just how strong the economic uptrend actually is.

**We're about due for the usual avalanche** of yearend economic forecasts. These are important and they can help you in making your plans because what people think will happen goes a long way toward making it happen.

**But in reading what the forecasters** have to say, don't forget that the usual pattern is to be behind the trend when the economy is moving up and ahead of it when the indexes are pointing down. This has been particularly true since 1929.

**Don't forget that about this time** last year there were some pretty dire predictions about how serious the recession would be. Fortunately, they didn't pan out. This time you can figure business will be somewhat better than most of the forecasters are willing to predict for the record.

**Indications of the growing if controlled** optimism being expressed by businessmen are recent surveys by Dun & Bradstreet and the National Assn. of Purchasing Agents.

**The Dun & Bradstreet study of a random** cross section of large and medium-sized manu-

facturers, wholesalers, and retailers indicates that most of them expect an upturn in first quarter of '55. In comparing first quarter '54 with what they expect in first quarter '55 their answers showed:

Net Sales: 56 pct expect increase; 31 pct no change; 13 pct decrease.

Net Profits: Up, 43 pct; no change, 45 pct; 12 pct, decline.

Selling Prices: Increase, 12 pct; no change, 76 pct; down, 12 pct.

Level of Inventories: Up, 24 pct; no change, 53 pct; decrease, 23 pct.

Number of Employees: More, 14 pct; same, 79 pct; decrease, 7 pct.

New Orders: Increases are expected by 55 pct of all manufacturers; 34 pct believe there will be no change, while 11 pct anticipate a drop in the number of new orders.

**Survey of purchasing agents showed most** of them reporting a business pickup but characterized it as a seasonal gain and a steady, gradual reversal from a recessionary period. They expect this trend to continue for the rest of the year.

**Order increases during October were re-**ported by 46 pct of the purchasing agents and 41 pct said production was up. Majority of the PA's indicate they have reached their minimum safe operating level. Concensus is that low inventories will be maintained for some time unless there is a sustained lengthening in procurement lead time. On buying policy most of the PA's said they were operating on a 90-day and under basis, with most falling in the 30-60-day category. About the same number are in the hand-to-mouth group as are buying on a 90-day schedule.

**Trend in employment is up.** Thirty pct report adding to payrolls compared to 15 pct recording declines. Not since June, 1953, has the group reported a 2-1 ratio in favor of increased employment. Overall, little overtime was indicated, but full time was more frequent.

## INDUSTRIAL BRIEFS

**New Plan . . .** Wheeling Steel Corp. has increased monthly pensions to be paid to employees who retired on or after Nov. 1, 1954. Under the new plan, production workers who have had at least 30 years of continuous service at the time of retirement and who reached the age of 65 will receive a minimum of \$140 per month, including Social Security.

**Entering Field . . .** Vitro Corp. of America has entered the field of uranium mining. The company has acquired an interest in 57 uranium claims from the Sateco Mining Co. in the Gas Hills area of Fremont County, Wyo.

**Opens Offices . . .** American Blower Corp., Dearborn, opened two new direct factory branch offices. One is at Portland, Ore., where W. S. Cooper will be in charge. The other is in Fort Wayne, Ind., with J. W. Johnson as manager.

**Record Made . . .** General Electric Co. has a record 288,804 share owners as of Sept. 24, an increase of 41,493 over a year ago.

**Gets Contract . . .** Oakland Aircraft Engine Service, Oakland, Calif., received two U. S. Air Force contracts totaling \$750,000.

**Prexy Elected . . .** National Tool & Die Manufacturers Assn. elected Jerome H. Stanek president at its annual convention in Dayton recently. Mr. Stanek is vice-president of Stanek Tool & Mfg. Co., Milwaukee.

**Chairman Named . . .** Orello S. Buckner, president of Bay State Abrasive Products Co., Westboro, Mass., was elected chairman of the board of directors of the Grinding Wheel Institute.

**Mill Depot . . .** Wolverine Tube, Div. of Calumet & Hecla, Inc., has opened a new mill depot to serve the customers in the Dallas, Tex., area.

**European Subsidiary . . .** Warner Electric Brake & Clutch Co., Beloit, Wis., has organized a new European subsidiary company, Warner-Electric, Ltd., in Zurich, Switzerland.

**Being Built . . .** Mackintosh-Hemphill, Pittsburgh, is building a 48-in. automatic roll contouring lathe for the new 24-in. wide-flange beam mill now under construction at the Indiana Harbor plant of Inland Steel Co.

**New Moniker . . .** Ace Metal Treating Corp., Elizabeth, N. J., is the new name of the former Ace Heat Treating Co.

**Research Office . . .** A division of Minneapolis-Honeywell Regulator Co., Micro Switch, has opened a new research and product development center in Denver, Colo., at 387 Corona St. The new office will provide improved engineering and product development service for users of precision snap-acting switches.

**Open House . . .** Airtemp Div. of Chrysler Corp., Dayton, marked its 20th anniversary with a 2-day open house on Nov. 13-14.

**Elbow Room . . .** Bailey Meter Co.'s New Orleans district office has moved to larger quarters at 909 S. Jefferson Davis Parkway.

**The Winners . . .** Paxton & Vierling Steel Co., Omaha, Neb., received the National Safety Council plaque for first place in the heavy fabricating division of the national industrial safety contest recently. The award was given for the company's safety record of no lost-time accidents from July, 1953 through July, 1954.

**Congrats . . .** Dr. Alexander L. Feild, associate director of research, Armco Steel Corp., has been named Sauveur Medalist for 1954. The Medal is given in recognition of achievements which have made a marked contribution to the basic knowledge of metals.

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**TRAVEL-CUT**  
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## Announcing the Clark-Ross Y-200

## Designed specifically for 20,000 lb. jobs!

### CHECK THESE FEATURES:

**Heaviest uprights in the industry:** Hi-tensile steel channel specially rolled for this truck.

**Shortest turning radius:** 15 feet; shorter than any other comparable truck.

**3 in. thick steel steer axle.**

**10 in. underclearance at uprights,** plus excellent weight distribution, permit operations under most severe yard conditions.

**Safety check-valve built-in:** a Clark-Ross exclusive; impossible to drop the load because of line failure.

**Planetary gear drive:** takes the strain off the axle; all drive components protected.

**Extremely easy to service:** hydraulic cylinder serviced from bottom, no need to remove uprights; engine and hydraulic system easily accessible.

From the ground up, the Y-200 is a genuine 20,000 lb. truck—not merely a beefed-up truck of less capacity. Pre-production models have been job-tested for nearly a year at steel mills, sawmills and wood treating yard.\* These trucks have proved their ability to cut handling costs under the toughest conditions. We are frank to say that we believe the Y-200 will give you better performance, at less cost, than any comparable machine. We invite your comparison: Simply call your local Clark dealer, listed under "Trucks Industrial." Or write us direct. There's no obligation.

\* Names supplied on request.

**CLARK  
EQUIPMENT**

ROSS CARRIER LINE  
Industrial Truck Division  
**CLARK EQUIPMENT COMPANY**  
Battle Creek 51, Michigan  
☐ Send details on Y-200

Name \_\_\_\_\_  
Firm \_\_\_\_\_  
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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

November 18, 1954





## Horsepower Zooms Up Under '55 Hoods

**Average of 1955 models announced thus far is over 200 hp . . . A 40 hp jump over 1954 . . . Major producers don't deny rivalry, feel that sales show the public is eager for more power—By R. D. Raddant.**

♦ TO DATE through the 1955 new model introductions, no auto executive has placed his tongue in his cheek and said, as he no doubt did a year ago, "We are in no horsepower race."

In the first place, psychology among the automakers has changed. They are no longer afraid of a public uproar over increased power. Secondly, the race is now so obvious that there is no point in denying it.

**Near 200 hp Average . . .** It is a fact that if the top horsepower cars offered by each of the 17 automakers are averaged, the result will approach 200 hp. With only Nash, Hudson and Kaiser unannounced, the average is an amazing 203 hp!

And this does not include the power packages that will be offered as extras or optional, but only the standard engines, although the most powerful in their respective lines.

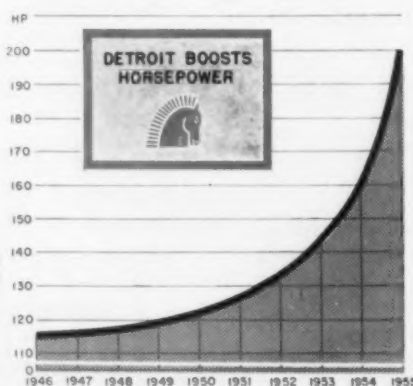
Of the 14 cars whose ratings are averaged, only Pontiac, Chevrolet, Mercury, Ford, Dodge, Plymouth and Studebaker don't have at least one 200 hp car. Balanced against them are Cadillac, 250; Buick, 236; Oldsmobile, 202; Lincoln, 225; Chrysler, 250; DeSoto, 200; and Packard, known to be over 250. Even the so-called low-priced cars will be in the 160's, and these will have dual exhaust and 4-barrel carburetor options that will add up to 20 hp.

**Race Started Slowly . . .** The postwar power race was slow in getting started. The average avail-

able horsepower in 1946 was a mere 115.1. That year Cadillac's best was 150 hp, a full 100 behind the 1955 engine. The average increased 6 hp in four years, principally through the introduction of the Oldsmobile Rocket engine, although that was held to a modest 135 hp.

The race was officially launched in 1951 when Chrysler's new V-8 was listed at 180 hp, bringing the average to 126.3 hp. It jumped almost 10 hp in the next year when all GM lines raised their ratings and Cadillac took over the lead with 190 hp. DeSoto also gained a V-8 as a companion to Chrysler.

**V-8's Boost Totals . . .** In 1953 a new Lincoln engine and added power along the entire list increased the available average to 145 hp. It jumped to 161 hp in 1954 on the strength of new Ford and Mercury engines and substantial increases along the line.



**HOW HORESPOWER** has increased in the postwar period. This Iron Age projection averages the top horsepower cars of each of the 17 makes, shows average available horsepower.

In 1955 automakers with high compression V-8's added from 10 to 20 hp, while new Chevrolet, Plymouth, and Pontiac engines and vastly reworked Ford and Mercury engines contributed to the present 200 plus average.

What is the reason for all this emphasis on power? Obviously, the industry believes that it sells cars. And, in spite of a tendency to blame the race on the sales side of the industry, a lot of engineers are as much behind it as the sales people. In fact, some engineers imply they would like to be "turned loose" and really get into a race.

**A Safety Factor . . .** There are many benefits from horsepower in addition to speed and pickup. Power when you need it can be a big safety factor. The new engines have increased efficiency resulting in increased gas mileage and lower axle ratio, which goes a long way toward lowering engine wear. Horsepower itself is not as important as torque, which is a valuable measurement, but the public is accustomed to horsepower and that is what it gets.

The importance the industry places on horsepower ratings was best illustrated this year when automakers were more cautious than usual in disclosing horsepower before models appear in their showrooms. As stated before, the implication from the automakers themselves is that juggling of horsepower is not impossible.

For 1955, the big impetus in the race came from the low-priced

categories, which increased the power of their top engines from 25 to 50 pct, as in the case of Plymouth.

There is some indication that the curve may level off in the next few years. In the first place, the figure may be almost high enough. The industry is just about retooled with new engines and those that don't have engines of their own can buy them from others in the new concept of "product reciprocity" that is taking place, particularly among the independents.

### Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Nov. 13 1954.....	120,208*	20,665*
Nov. 6, 1954.....	96,089	20,474
Nov. 14, 1953.....	96,856	18,912
Nov. 7, 1953.....	120,377	13,406

\*Estimated. Source: Ward's Reports

## Debuts:

### GM, Ford, Chrysler introduce seven '55 lines this week.

A total of seven new cars was introduced this week, prohibiting a detailed summary of what each has to offer. In many cases, companion lines have been on display for some days, making it unnecessary to go into the fine points of each. Here, in impartial alphabetical order, are the highlights of the seven:

**Buick . . .** This third-place-in-the-industry division of GM has one of the most important engineering innovations of the year in its variable pitch Dynaflo transmission. In this development, the blades of the Dynaflo stator change their angle when the accelerator is pressed to the floor, then revert to a more economical pitch when the need for sudden power is passed. A completely new rear quarter panel revising the rear end and a new grille are styling highlights. Horsepower is increased on all four models.

**Cadillac . . .** GM's top quality car maintains its traditional styling but with considerable variation in body trim and a new grille.

Horsepower is up to 250 but the new El Dorado will generate 270. This package, consisting of dual 4-barrel carburetors and better engine breathing, is optional on other lines. The new power will add to the economy factor, with a 9 to 1 compression ratio.

**Dodge . . .** The boast of 100 structural and mechanical innovations is made by this Chrysler division. It combines the now well-known restyling of all lines with increased power that goes up to 193 hp. All cars are restyled, longer and lower.

**DeSoto . . .** This is another "Forward Look" car that goes up to 200 hp in the upper class battle of styling and performance. DeSoto customers will also have the dashboard selector lever that is entirely new this year on all five Chrysler lines.

**Lincoln . . .** A new innovation available on Lincolns is an automatic starter that operates merely by shifting the gear lever to the neutral position. A restyled rear quarter gives the car a completely new silhouette and 8 in. additional length. This year Lincoln has a

## AUTOMOTIVE NEWS

new Turbo-Drive transmission that employs a kick-down throttle for fast acceleration. The 225 hp engine has permitted a reduction of the axle ratio from 3.31 to 3.07, increasing gas mileage and lowering engine wear.

**Oldsmobile . . .** A facelifting and increased power and performance characterize the 1955 Oldsmobile. A new front end and revised treatment of the highly successful two tone paint job are the outstanding external features.

**Plymouth . . .** This bread-and-butter division gained the full impact of Chrysler's determination to fight it out on even terms with Ford and GM. It goes up to 177 hp with a power package and has a full range of automatic and power devices. Its all new styling includes new dimensions that make a 4-door sedan 10.3 in. longer, 1.7 lower, and add 3.2 in. to the front seat width and 5.9 to the rear.

## THE BULL OF THE WOODS

By J. R. Williams



# WATERBURY FARREL HIGH SPEED BLANKERS

With a modern, Waterbury Farrel High Speed Blanker you can uniformly blank, pierce, shallow draw and form identical parts in cost-cutting, mass production quantities.

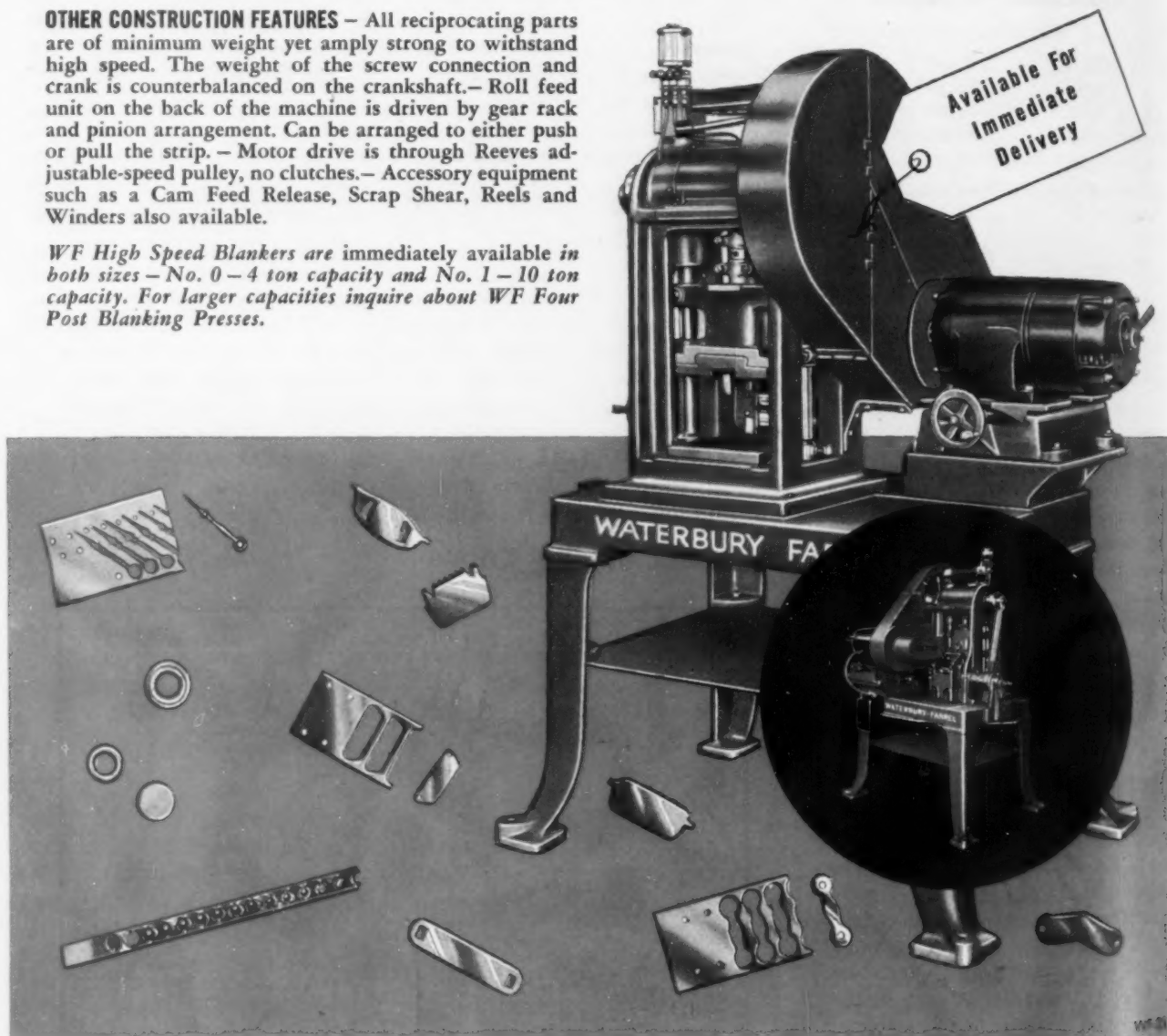
The samples shown here give you just an inkling of the variety of work that can be done using ordinary, lightweight, simply-designed progressive tools.

**TWO-POST GATE GUIDES CONTROL ACCURACY—PROTECT TOOL LIFE**—The gate is clamped to two hollow posts that slide in bearings above the gate and also below the die level. This minimizes tool deflection and assures consistent accuracy.

**OTHER CONSTRUCTION FEATURES**—All reciprocating parts are of minimum weight yet amply strong to withstand high speed. The weight of the screw connection and crank is counterbalanced on the crankshaft.—Roll feed unit on the back of the machine is driven by gear rack and pinion arrangement. Can be arranged to either push or pull the strip.—Motor drive is through Reeves adjustable-speed pulley, no clutches.—Accessory equipment such as a Cam Feed Release, Scrap Shear, Reels and Winders also available.

WF High Speed Blankers are immediately available in both sizes—No. 0—4 ton capacity and No. 1—10 ton capacity. For larger capacities inquire about WF Four Post Blanking Presses.

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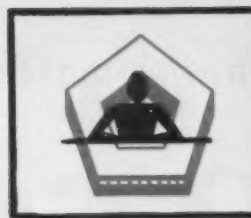


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THIS WEEK  
IN  
WASHINGTON

## Plan Taft-Hartley Revision in '55

**Act to offset union criticism of Administration . . . Labor Secretary Mitchell prepares recommendation for modifying Taft-Hartley and boosting the minimum wage . . . Fear runaway in law revision—By G. H. Baker**

♦ **LABOR** Secretary James P. Mitchell moves to offset union criticism by preparing recommendations for (1) increasing the national minimum wage and (2) re-writing the Taft-Hartley law to the union leaders' liking.

Mr. Mitchell is irked at the "anti-labor" charges made against the Eisenhower Administration by some union officials. He believes the Administration's labor record is a good one, and is now out to demonstrate his good faith by asking the new Congress to remove the so-called "union-busting" features of the Taft-Hartley law and to boost the national minimum wage from 75¢ to \$1 per hour.

What success Mr. Mitchell will have with these two proposals remains to be seen. Nearly all members of Congress agree that there's room for improvement within the Taft-Hartley law, but they fear that once the law is opened up for amendment, the New Deal-Fair Deal elements in the Senate and House will "grab the ball and run with it." Rather than run this risk of excessive "bleeding" of the law, they'd prefer to see it continued as is.

The proposed increase in the minimum wage stands a much better chance of enactment next year. Raising the wage floor to \$1 per hour will not be so heavily contested.

**May Cut Tariffs . . .** Strong possibility of big-scale tariff cuts is in the making. Next year's Democrat-controlled Congress may vote sweeping authority for the White House and the State Dept. to en-

ter into tariff-cutting agreements with several of the other nations.

Rep. Jere Cooper (D., Tenn.)—slated to become the new chairman of the tax- and tariff-writing Ways and Means Committee—is clearly on record as believing that U. S. tariffs should be "liberalized" so as to permit the wide-open importation of foreign industrial goods and farm products.

If President Eisenhower elects to push actively for revisions in the Reciprocal Trade Act, the re-writing job may go even further than some Republicans now believe.

**Not Enough Mills . . .** There's a crying need for additional machinery and mills to process uranium ore. The eight mills now in operation are swamped by the tremendous output. "It's phenomenal," say Atomic Energy Commission officials.

Problem is to get new mills in



"He says you promised him a day off . . . with voltage!"

operation to process the ever-increasing tonnage.

Ore-buying offices throughout the Colorado plateau (Colorado, Utah, Wyoming, New Mexico, Arizona) are jammed with bulging stocks of purchased ore.

Even when the ninth processing mill (now under construction) is opened, refining capacity still will be far behind demand.

Firms interested in building processing machinery should contact the Atomic Energy Commission office at Grand Junction, Colo. (Seven of the eight mills now in operation are privately owned. One is owned by the government.)

**Will Stay Hot . . .** Pressure on the national housing supply will keep demand for new homes at a high level well into 1955.

A healthy rate of homebuilding next year is indicated by the expectation that several million more veterans will take advantage of their GI home loan opportunities before their rights expire and by the anticipated effect of liberalized credit ceilings provided in the 1954 housing legislation.

Residential building will have to move at a very brisk pace in 1955 if the record being compiled this year is exceeded. Through the third quarter, the rate of house and apartment construction was valued at more than \$1 billion a month.

Total outlays for all types of construction in the third quarter added up to \$10.7 billion, bringing the figure for the first 9

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Delco fractional and integral motors are readily available in a wide range of sizes to assure you of the best running mate *your* product can have.

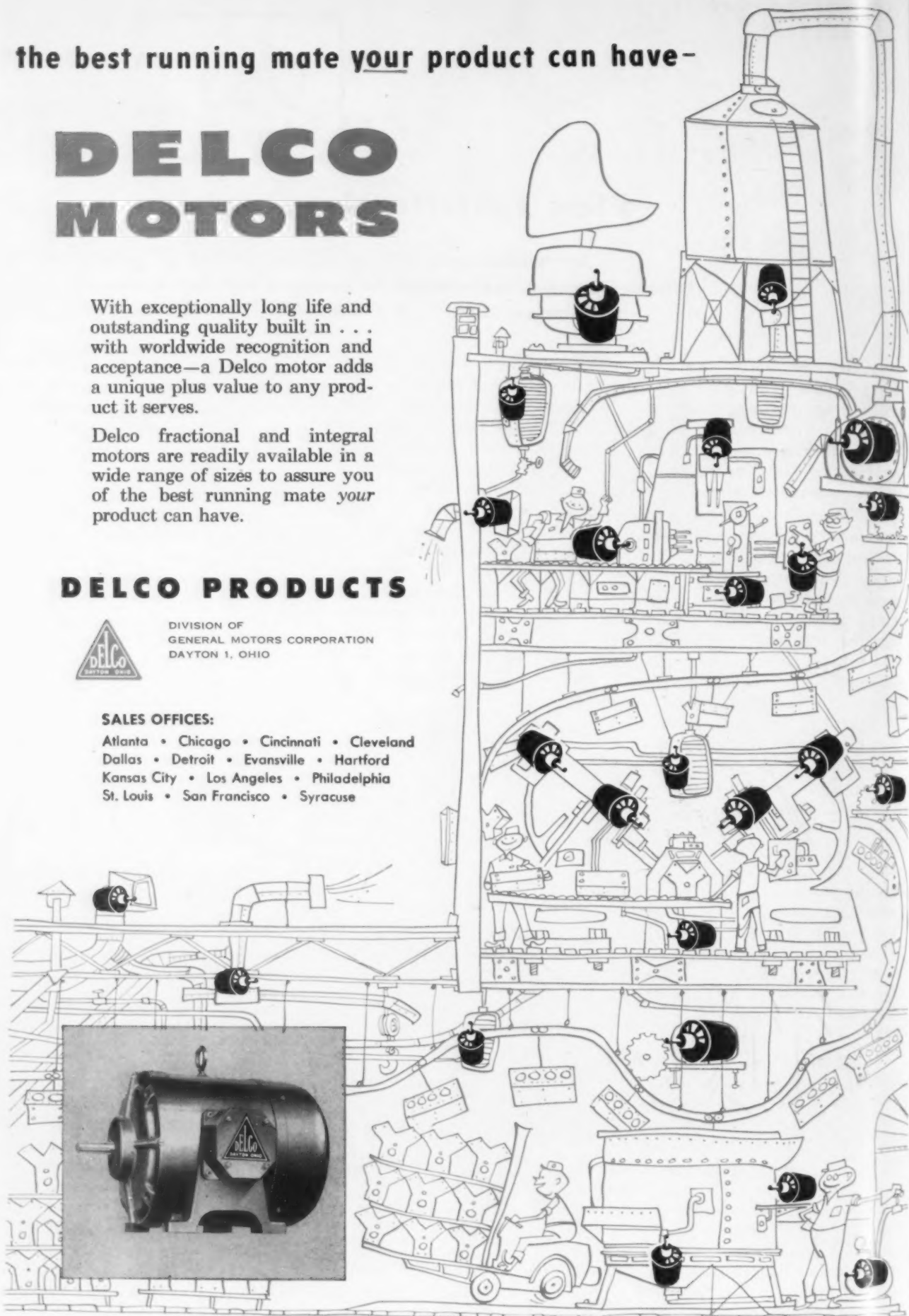
## DELCO PRODUCTS



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months of 1954 to \$27.4 billion. Private spending was 6 pct higher than in 1953, while public funds were being used at about the same rate as last year.

**Cooler on China . . .** Foreign-policy planners are cooler now than ever before toward the idea of recognizing Red China. New chill is based largely on the squeeze now being applied to British firms trying to do business with the Chinese.

Lord Reading, the British Foreign Under Secretary, speaking recently in the House of Lords, expressed deep disappointment that British hopes for extensive trade with Communist China had not measured up to expectations. Worse than that, he disclosed, the Reds are trying to ease British firms completely out of the Orient without paying them for their assets. He admitted that the assets of British firms in Shanghai have been reduced from about \$840 million to less than \$112 million since the Reds took over.

The Communists apparently have not heard about Prime Minister Churchill's policy of "co-existence." British Foreign Office says the Reds want foreign firms to surrender their assets upon leaving the Orient. No payment is mentioned, much less made, to the foreign firms. Here's your hat—what's your hurry?

### New Tax Ruling

A state may impose a use tax on goods shipped in from another state if the firm distributing the merchandise employs salesmen or agents in the state imposing the tax. If there is no solicitation the tax cannot be imposed.

That's the effect of a decision of the U. S. Supreme Court not to review a lower court ruling in a case involving an Arkansas use tax on machinery and explosives sold to Arkansas residents by three Memphis, Tenn., dealers. Left standing is an Arkansas Supreme Court ruling that the use tax is constitutional and the goods were not in interstate commerce because the three firms employed salesmen to solicit orders in Arkansas even though the actual sale took place in Memphis.

The U. S. Supreme Court ruled last spring that Maryland cannot collect tax on a Delaware firm's products delivered across the line because the firm does not employ salesmen in Maryland to solicit orders.

### Workweek Sturdier

Sharp increase in auto industry employment and the general industrial activity it creates more than offset a normal seasonal decrease in employment and brought increases in factory work weeks and payrolls last month.

Although total employment dipped 3000 to 62.1 million from September to October, unemployment plunged 358,000 to 2.7 million as seasonal workers left the labor force. The figures, reported by the U. S. Labor and Commerce Depts. were made public a week ahead of schedule, just prior to the elections. (THE IRON AGE, Nov. 4, p. 81.)

### Nears 40 Hours

Key indicators in the report show that the average factory work week increased by 12 minutes to 39.9 hours in October, but was still 24 minutes below the same period last year. Production workers averaged \$1.81 an hour, including overtime, and average weekly earnings rose 36 cents to \$72.22.

Biggest employment rise, apart

## WASHINGTON NEWS

from autos, came in the electrical machinery industry, but primary metals dipped by 5300 and nonelectrical machinery dipped by 8700.

### Ease Bargaining Rule

A firm may bargain with an incumbent union and enter into a new contract with it even if a rival union has a representation petition pending, National Labor Relations Board rules.

In a split decision, NLRB modified a rule adopted some 10 years ago that it was unfair for an employer to contract with one of two or more rival unions while a representative petition was before the board.

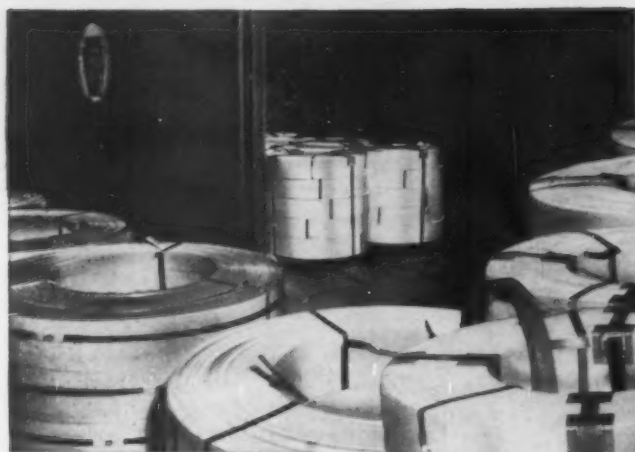
In the latest decision, NLRB declared legal an action of the William D. Gibson Co. in signing a renewed contract with the CIO Steelworkers although the AFL Machinists had filed a petition to represent 30 toolroom employees who had been included in the CIO unit.

The board also upheld the right of the firm to discharge 17 toolroom workers who favored the machinists' union for failing to pay dues under the union shop clause of the new contract shortly before a bargaining election.



HOWARD J. MULLIN, right, St. Louis district sales manager for U. S. Steel Corp., is sworn in as Director of Iron & Steel Div. of Business and Defense Services Adm., U. S. Dept. of Commerce.





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UNITED STATES STEEL



## West's Steel Consumption Off 10 Pct

Use 5.4 million tons of steel in western states this year . . .  
Inventories account for slight decrease . . . Local mills supply 50 pct  
of region's growing demand . . . Flat products up—By R. R. Kay

♦ **FAR-WESTERN** steel consumers will gobble up 5.4 million tons of steel in 1954, 10 pct below record 1953.

Moderate drop in steel needs and decrease in consumer's inventories account for the decline. General belief here is that inventory reductions are just about finished.

**Products Plentiful** . . . Most steel mill products stayed in good supply during 1954; plate and wide-flange beams weren't quite as easy to get as merchant bars or structural shapes.

Steel consumers set a peacetime record for 1953, absorbing a bit over six million tons of mill products. A soon-to-be-released survey by Kaiser Steel Corp., Oakland, Calif., will show what and how much went to California, Oregon, Washington, Idaho, Arizona, Nevada, and Utah.

**Meet Half of Demand** . . . And how's the western steel industry

### Steel Consumption Compared Seven Western States

Product Group	Thousands of Net Tons		Pct Change
	1952	1953	
Plates, Sheared & U. M.	939	1,108	+ 18
Structural Shapes	414	544	+ 31
H.-R. Bars & Bar Size Shapes	1,030	989	- 4
Sheets & Strip	869	1,126	+ 30
Standard & Line Pipe	475	530	+ 12
Tin Mill Products	867	895	+ 3
All Other Mill Products	821	1,124	+ 37
Gross Total	5,415	6,316	+ 17
Adjustment for Conversion*	68	237	+ 249
NET TOTAL	5,347	6,079	+ 14

\* Steel mill products received by consumers and converted into other mill products have been subtracted from the total to avoid duplication.

getting along serving the growing West? Very well indeed. In record 1953, as in 1952, local mills kept the pace, producing over one-half the total demand. Eastern mills supplied about 40 pct and foreign, 2 pct.

Flat-rolled products and structural shapes, used chiefly by manufacturers and fabricators, showed healthy increase over 1952. Bar products, with widely diversified uses, were down some. Tin mill products, standard and line pipe increased a bit.

**Many Small Shops** . . . Only five pct of the nation's metalworking plants with 500 or more employees are in the seven western states;

but the area has over 17 pct of shops with three employees or less. The large number of small plants has meant greater volume for steel warehouses.

Table below shows where 1953's 6-million tons of steel went: southern California, 42 pct; northern California, 35 pct; Pacific Northwest, 14 pct; Arizona, Utah, Idaho, and Nevada, 9 pct.

Southern California needed large quantities of flat-rolled products and standard and line pipe. By far the biggest demand in northern California was for tin mill products and sheared plate.

The Northwest used a lot of reinforcing bars, merchant bars, and structural shapes.

### Steel Products Consumed by Western States

Steel Mill Products	Thousands of Net Tons				
	Total Seven Western States	1953 Southern California	Northern California	Oregon, Washington	Arizona, Utah, Nevada, Idaho
Plates:					
Sheared Plate	1,057	442	428	105	82
Universal Mill Plate	51	14	17	16	4
Structural Shapes:					
Wide Flange Beams	191	71	63	36	21
Standard Structural Shapes	353	136	96	81	40
H.-R. Bars & Bar Size Shapes:					
Carbon	507	220	128	121	38
Alloy	86	64	11	8	3
Concrete Reinforcing	396	142	118	102	34
Hot-Rolled Sheets	529	281	186	44	18
Hot-Rolled Strip	64	39	15	7	3
Cold-Rolled Sheets	255	156	75	20	4
Cold-Rolled Strip	80	37	18	4	1
Standard and Line Pipe:					
Pipe 1/2"-4"	346	193	81	40	32
Pipe 5 1/8"-12 3/4"	184	96	34	33	21
Tin Mill Products	895	176	557	144	18
Galvanized Sheets	218	98	61	43	16
All Other Mill Products	1,124	504	318	105	197
Gross Total	6,316	2,669	2,206	909	532
Adjustment for Conversion*	237				
NET TOTAL	6,079				

\* Steel mill products received by consumers and converted into other mill products have been subtracted from the total to avoid duplication.

# Never Confuse the No. 8 MARVEL with an ordinary Band Saw ...only the MARVEL is Universal



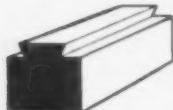
Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a 1/8" rod or cut-off an 18" x 18" cross section



Rough to Size and Shape



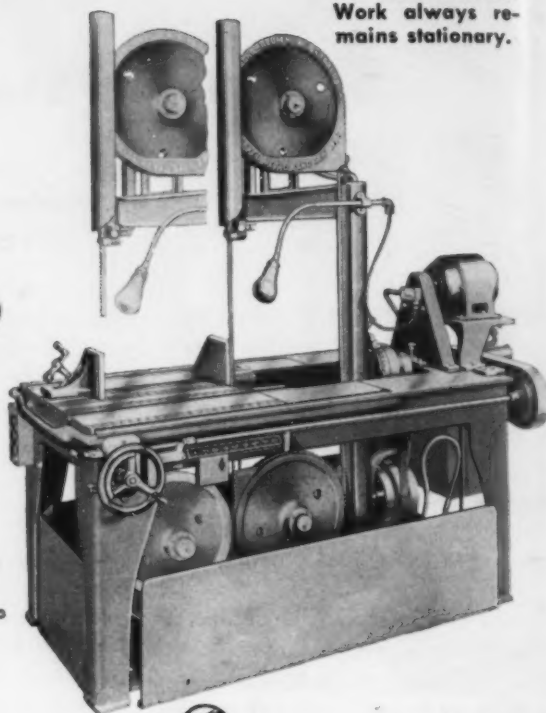
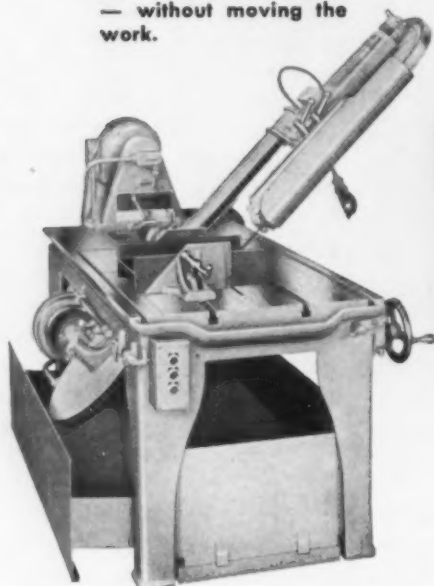
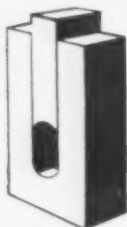
Miter



Index



cut off and shape  
Structural Beams.



Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

## "Rough Machine" to size and shape with minimum chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.



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## New Tool Models Get Deserved Fanfare

**Tool builders put more razzle dazzle into new model introductions . . . Demonstration rooms gaining popularity as sales aids . . . See gains for tool, die industry . . . Buyers like demonstrations—By E. J. Egan, Jr.**

♦ NEW machine tool models, like the 1955 cars, are being unveiled this fall with fanfares and flourishes. U. S. machine tool builders, sometimes accused of conservatism, seem to be borrowing a little of the automotive industry's razzle dazzle technique.

Reminiscent of the new car introductions is the name Dyna-Shift which Monarch chose for its new heavy duty lathe line.

Cincinnati Milling Machine Co., The Bullard Co., and The Monarch Machine Tool Co. are among major builders who have staged impressive new model presentations this fall. Each was noteworthy for effective showmanship, which builders hope will be compatible with good salesmanship.

Pattern for these new product announcements is about the same whether they concern cars or machine tools. Trade press representatives are invited in for the first look, get a warm welcome from company top brass. A tour of plant facilities and a good lunch with management officials

help set the stage and build suspense up to the moment of the big show.

**Seeing Is Believing . . .** The tour trail finally leads to the demonstration room where the audience assembles expectantly. At a signal the curtain is raised to reveal a shiny new metalworking marvel. An operator presses the "start" button and the demonstration is underway.

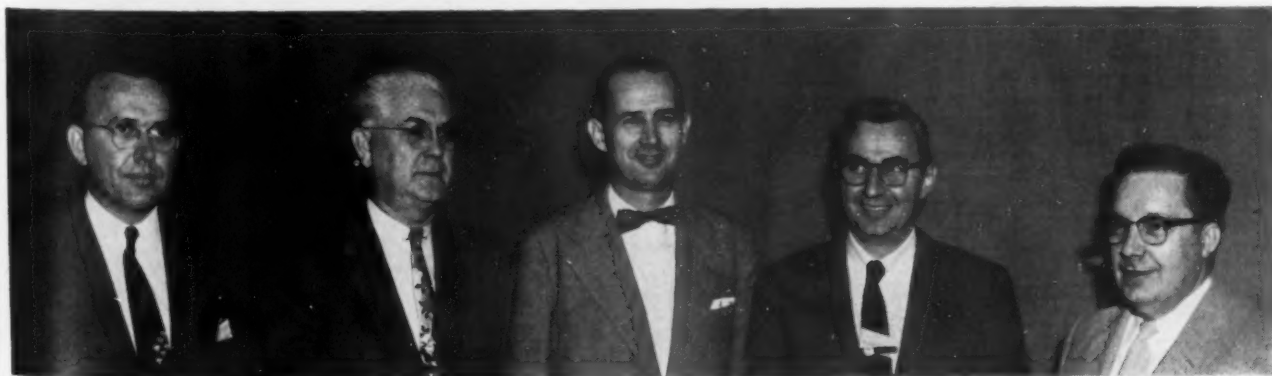
A neat, clean showroom with the very latest machine tools under power isn't just a piece of fluff tossed into the modern builder's merchandising program. It's a solid, sensible way of proving that actions speak louder than words.

**Built for Customers . . .** Spacious, comfortable demonstration rooms are mushrooming in builder's plants. Where such an area can't be created in existing floor space, companies are adding the necessary construction.

These showrooms are primarily

intended to benefit the prospective customer. New model machine tools are complex mechanisms, products of the latest research into metal cutting techniques, electronics, hydraulic components, etc. As such, the machines are usually much more than face-lifted versions of former designs. And builders seem to feel that convincing demonstrations, more than words, will be most helpful in convincing prospective customers.

The prospect for a new or replacement machine tool should find it well worthwhile to see the equipment put through its paces on the showroom floor. He can concentrate on observing and inspecting the machine leisurely and thoroughly. He won't be distracted by factory noises; he won't have to shout his questions in order to be heard. To get a good look he won't have to step around work in the plant or dodge honking lift trucks and loaded overhead cranes.



NEW OFFICERS of National Tool & Die Manufacturers Assn. are (left to right) Philip R. Marsilius, Bridgeport, treasurer; Joseph N. Huser, Indianapolis, first vice-presi-

dent; Jerome H. Stanek, Milwaukee, president; Herbert Harig, Chicago, second vice-president; and Harold G. Murdock, Los Angeles, secretary.

# SOLAR'S

## SURE-SPEC STEELS



*steel for any part  
you make for any product  
anytime at minimum cost!*

*Solar furnishes steel to the makers of the famous Ironrite electric ironers. Shown is the deluxe model which makes ironing a breeze in  $\frac{1}{2}$  the time required by hand.*



*"for service dependable as the sun"*

### SOLAR STEEL CORPORATION

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## The Iron Age

## SALUTES

### Frederick R. Dickenson

A vigorous, athletic dynamo, he doubled his company's sales in eight years, believes that one of an executive's top responsibilities is the grooming of a better man to take over his own job.

The man who acts like he's not interested in the boss's job at the Townsend Co., New Brighton, Pa., is treading on thin ice. Because the boss happens to be dynamic, broad-shouldered Frederick R. (Dick) Dickenson, who believes a good company should train its future leaders.

Dickenson reminds officials of the 138-year-old company, nation's largest manufacturer of cold-headed fasteners and small parts, that while their production and sales performance is important, they also are rated on how well they're grooming others to take over top spots in the years ahead.

Dickenson himself quit a good job eight years ago because he thought he'd never be president of the company. He found what he was looking for at Townsend, joining the company as executive vice-president and taking over the president's chair in September 1948.

Under his direction, the family-owned Townsend Co. grew quickly. He put idle cash to work to diversify the product line, has acquired four

companies which have enabled Townsend to compete in the aircraft and automotive industries, and in the Canadian fasteners market. In eight years company sales rose from \$6 million to \$15 million; earnings from \$355,000 to \$604,000.

And the 45-year-old Dickenson shows no sign of slowing down. He's building a new plant at Ellwood City, Pa., about 10 miles from the original Townsend works at New Brighton, Pa.

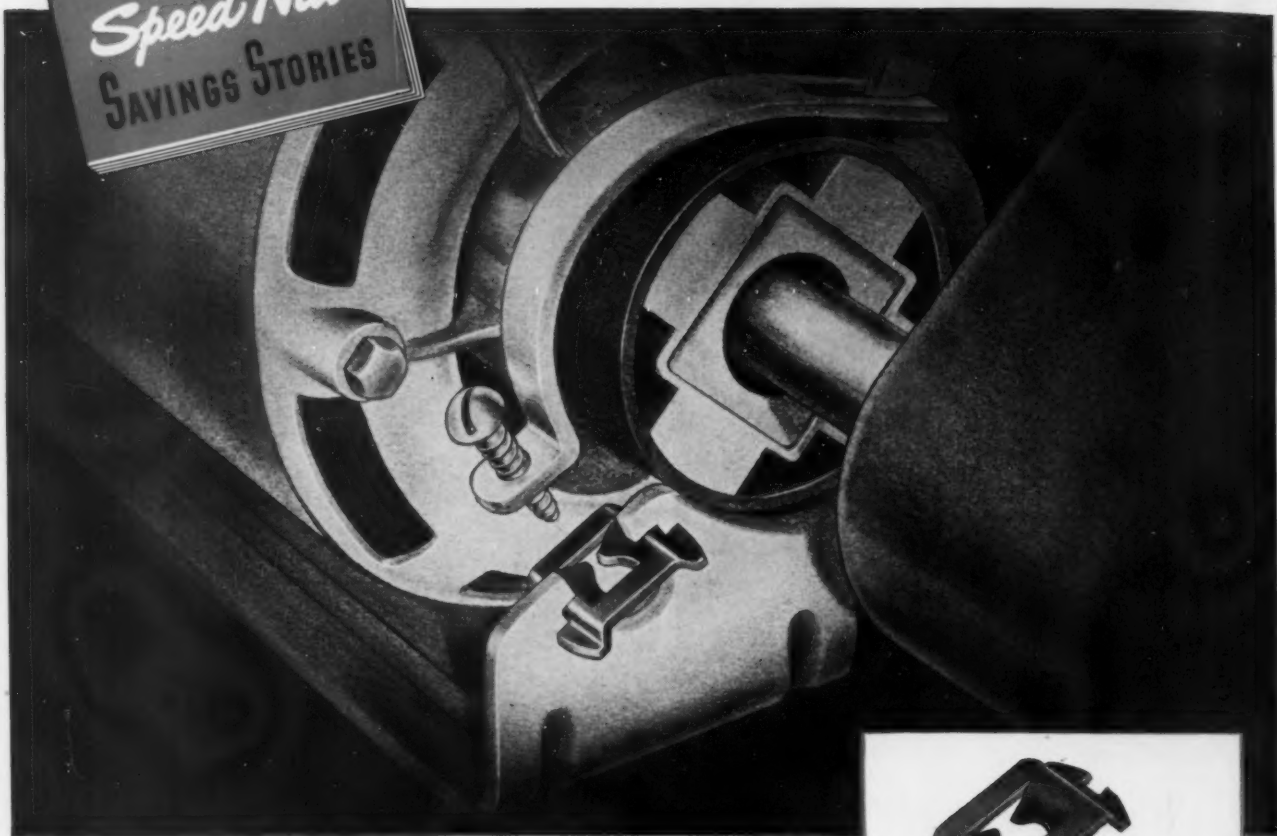
A man of boundless enthusiasm and energy, Dickenson wades into every challenging project with hands and feet flying, figuratively at least. His taste in sports runs mostly to the "violent" type, like hockey, which he played "boldly" when younger; baseball, where he was a fair-to-middling catcher; and football, in which he did some quarterbacking while in college.

A mechanical engineering graduate of the University of Toronto, Dickenson lives in Patterson Heights, overlooking the New Brighton plant. The Dickensons are parents of three children—two girls and a boy.





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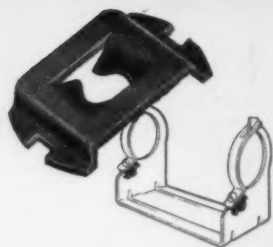
Easy Spindrier

What was causing delays in the production of the new Easy Spindrier? Easy engineers recently found out in a hurry. It was the motor mount bracket assembly. A staking operation was creating a decided bottleneck.

Borrowing on their own long-time experience with SPEED NUT brand fasteners—and the help of the Tinnerman field engineer—they hit on a highly successful solution using a special Flat-Type SPEED NUT!

*Proof of the success was supplied through a startling 87% saving in production time—and an overall cost savings of 47%!*

Little wonder, then, that Easy engineers saw to it that over 60 SPEED NUTS were designed into the new Easy Automatic Washers.



Special self-retaining Flat-Type SPEED NUT snaps easily into existing notch in bracket. Replaces round nut which was staked down, often causing distortion of nut—this meant re-tapping. Also, paint clogged around nut, causing screws to bind. Paint can't clog SPEED NUTS.

Send today for your copy of SPEED NUT "Savings Stories"; write: TINNEMAN PRODUCTS, INC., Department 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Limited, Hamilton, Ontario. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales. In France: Aerocessaires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine).



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**the Iron Age**  
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TECHNICAL  
ARTICLES

## Casting Quality, Ease of Mechanization Key Shell Mold Advantages

Part I

♦ The shell molding process, with its improved foundry product, has proved highly adaptable to mechanization . . . This winning combination is helping to improve the industry's competitive position.

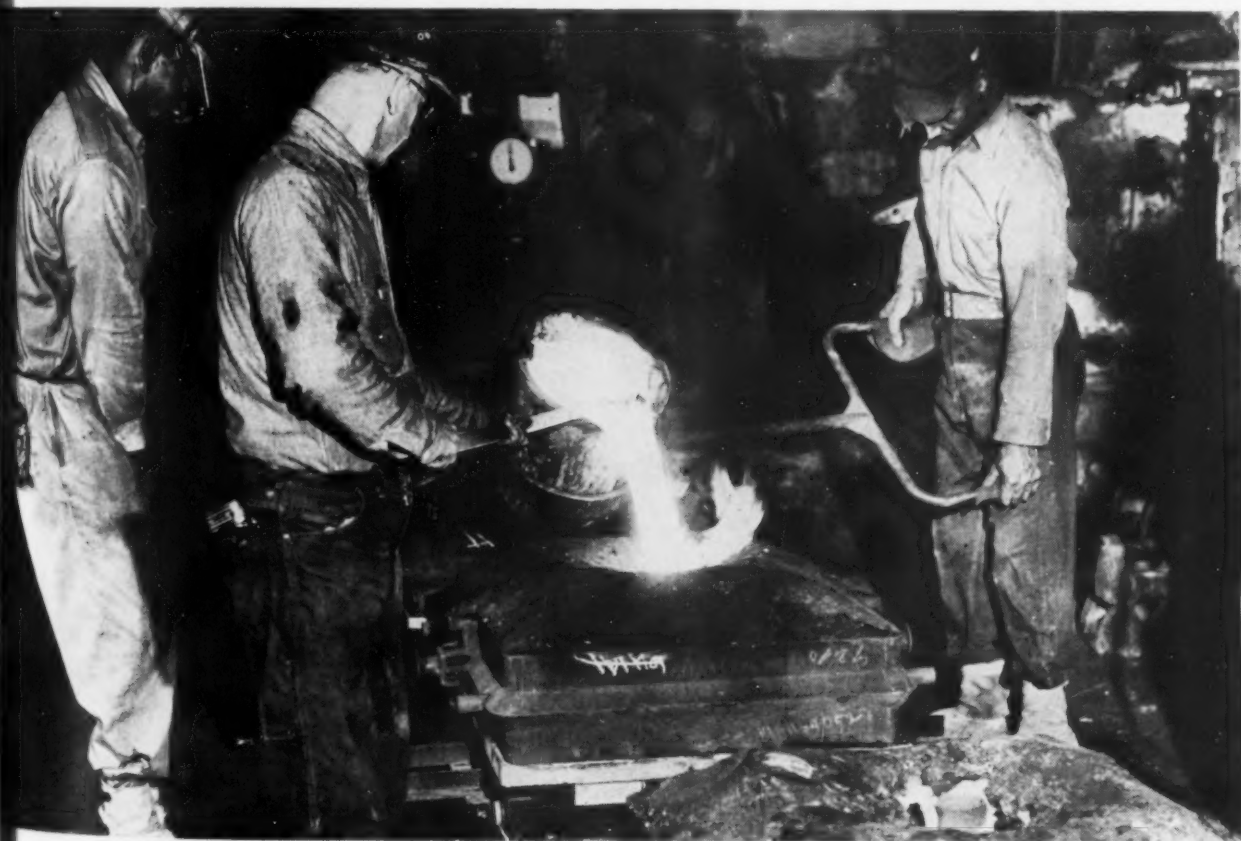
♦ New automatic and semi-automatic equipment forms, cures and ejects shells at a high production rate . . . Shakeout is easier and castings require less cleaning . . . Resins provide a better method of bonding shells.

♦ ADAPTABILITY to mechanization is a key advantage of the shell molding process. Mechanization has made it possible to produce castings of superior quality at a high rate with comparatively little skill. This combination, plus advantages of the process, has in a few years pushed shell molding from the status of an interesting experiment to an accepted production method.

Most companies took their first look at shell molding in the laboratory or a corner of the foundry with simple equipment. From this start, foundrymen designed equipment to meet their individual needs. Now machinery producers have made available new automatic and semi-automatic equipment to form, cure and eject shell molds. Two types of automatic machines—single

By W. F. Bye,

Senior Product Estimator  
Spicer Mfg. Div. of Dana Corp., Toledo



MOLDS are routed to pouring station for casting of 37-lb stainless steel support ring at Cooper Alloy

Foundry Co., Hillside, N. J. Movement of shells to pouring station is rapid, cuts overall pouring time.

November 18, 1954

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## Shell Molding in the Metalworking Economy

Conventional foundry methods, by their nature have placed many modern foundries at a competitive disadvantage with more mechanized industries . . . As a result, modern foundries have experienced increasing competition from other industries . . . The producers of forgings, stampings, and fabricated parts, making wide use of mechanization, have been able to supply structurally sound parts, with finer finishes at a lower cost . . . Foundries have been forced to extract the very maximum from their labor and equipment to meet competition and maintain a profit . . . Shell molding has filled the recognized need for a more efficient casting process capable of producing to closer tolerances, providing a better finish and metal structure, yet comparing in cost with conventional methods.

### Spotting a Shell Mold Job

A job that is adaptable to shell molding will usually have one or more of the following characteristics:

1. Requires a high degree of finish.
2. Requires intricate detail.
3. Replaces a job that would need a large amount of draft if cast by any other method.
4. Cannot normally be made by conventional green sand methods.
5. Requires a lot of machining.
6. Has holes or openings that can be incorporated in the mold halves.

### Some Shell Molding Advantages

Castings have superior finish, in the range of 125 micro-inches.  
Tolerances can be held between 0.002 and 0.005 in. per inch along the mold face.  
Castings have better internal structure, less porosity.  
Sections as thin as 0.010 in. can be accurately cast without warpage.  
Draft can be decreased to 0.5° to 1°.  
Sprues and gates are often smaller, requiring less metal to be poured.  
Foundry sand usage is decreased approximately 90 pct.  
Hot tearing and cracking of casting surfaces are largely eliminated.  
Floor space requirements may be substantially reduced.  
Less time required in shakeout, removal of sprue and gating, cleaning.  
Machining may be substantially reduced or eliminated.  
Molds can be made ahead, and stored for future use.  
Less skilled operators may be used to produce molds.

and multi-station—are used. In the multi-station machine, designed for high production, the pattern moves through the various steps on a turntable. The equipment usually takes four or more patterns and uses dutch ovens for heating.

With a multi-station machine, 250 or more shells per hour can be produced. Three to four men may be required for the operation, and high production items are needed for maximum economy.

With a single station machine, the sequence of operations is generally automatic except for periodic addition of mix to the hopper and removal of shells. Shells produced usually contain a cope and drag section. By installing an assembly device by the machine, one man can produce about 40 finished molds per hour.

For efficient high volume production, several other types of equipment are needed. These include: Enclosed hoppers for sand and resin; automatic weighing and mixing in dust tight compartments; a means of conveying ingredients to the mixing stations and the mix to the shell molding machine; automatic shell ejection devices.

Stations are also needed for assembling molds. Provision must be made for placing the molds in flasks and backing them up with shot or sand. Pouring stations should be close to metal charging to minimize materials handling.

Equipment that will shake out the casting and return the backup material is needed. Provision should be made for cooling and cleaning backup material before reuse. A conveyor system reduces materials handling between production of the shell and automatic shakeout of the casting. Means of conveying and cooling the castings to an area for cleaning and heat treating helps speed the operation.

To produce a finished shell mold casting, the cope and drag shell sections are assembled, and the mold placed in a flask and backed up with shot. The metal is poured, cooled and rough casting shaken out. After gates and sprues are removed, the castings are heat treated and cleaned.

Cope and drag shells may be assembled by glueing, nailing, bolting, clipping, etc. The method of assembly should be rapid, assure a firm bond, and provide sufficient contact between surfaces to prevent excessive finning.

Many foundrymen now use low-cost fast drying glues for shell assembly. The shallow glue tanks are inexpensive, and a firm bond is obtained. The operator is able to run a shell molding machine and assemble shells at the same time. Unfortunately, moisture in the air occasionally causes poor bonding, resulting in excessive flash.

Clips, staples and C-clamps are often used. While a flash fin may be obtained on the parting line, it can usually be held thin enough for easy





**MOLDING SAND** is used to back up molds at Indianapolis Works of International Harvester Co.

Here molds are set in flask. After backup sand is added, flasks are set on mold cars for pouring.

removal. Nails and bolts tend to warp the mold and result in hard to remove flash.

Most recently a resin mixture has been used for bonding. The shells are sprayed with a resin mix and hot pressed together to form an adhesion similar to the bond in the shell itself. This development may produce one of the best methods of assembly to date.

Assembled molds are usually placed in a flask and backed up with a fine steel shot or coarse sand of about 50 AFS. The backup material should be strong enough to prevent warpage or collapse of the mold before the metal solidifies. It should also be sufficiently permeable to allow escape of gases. Some vibration is needed to settle the backup and obtain a firm support. Special vibrating tables are available and should be used in production.

#### **No difference in pouring**

Steel shot provides a firmer, more permeable backup than sand, and some foundrymen report castings backed with steel shot have higher strength and superior internal structure. Use of a backup material has disadvantages. It must be cleaned and cooled before reuse, making conveyors and other equipment necessary.

Castings to 25 lb and larger have been poured successfully without a backup material. Assembled molds are mounted in unsupported steel frames. If shell molds are to be poured without

backup, a thicker shell and higher resin content are needed.

There is no essential difference in pouring green sand and shell molded castings. Ladle pouring is used and both types of castings may be poured at the same time. Pouring by this method has advantages. Shell molds have better insulation characteristics and it is possible to pour at a lower temperature.

This temperature differential can be in the order of 100° to 200°F less than required for green sand pouring. If increased over 200°F excessive scrap will occur. This advantage makes metal heating time faster and decreases heating cost. When foundries feel justified in heating metal separately for shell molding, this will result in a lower fuel cost.

Since shell molds can be handled and moved so easily they can be taken to the metal for pouring. Normally metal is taken to the molds in green sand casting because molds are bulky and present a problem in materials handling. By moving the shell molds to a location convenient for pouring, much handling of molten metal can be eliminated.

#### **Handle castings with care**

Shakeout is much easier with shell molds. Little vibration is required and the casting comes out almost free of sand. Virtually no cleaning is required, scale is eliminated, and adhering sand



**PRECISION CORES** made from sand resin mix have strength and rigidity. This assembled core is made

for use in production of aluminum castings by the Maco Corp., Huntington, Ind. Courtesy Bakelite Co.

can be easily removed. Time of cleaning is substantially reduced. Smaller gates and sprues are easier to handle and can be removed in less time. In many cases heat treating is not needed since the skin hardness normally obtained is eliminated.

Shell molded castings must be handled with more care. Usually the casting has been made with tolerances of a few thousandths compared with the normal 1/16 in. or more. Rough handling, severe heat treating and excessive shot blasting will eliminate many process advantages.

Almost all metals can be cast in shell molds, including gray, nodular, pearlitic, malleable and meehanite irons; aluminum alloys; alloy, carbon and stainless steels; and certain types of brass, bronze and magnesium.

Best results have been obtained with the aluminum alloys and irons. Castings are cleaner, shake out more easily and have better surface finish.

Successful castings have been made in other higher strength alloys. Casting qualities may not be so good as with aluminum and iron but these materials still show advantages over green sand methods.

Most difficulty has been encountered in pouring high lead and tin alloys, low carbon steels and magnesium alloys. The high lead brasses and high tin bronzes tend to sweat when poured.

Low carbon steels have generally produced poor castings but some jobs are beginning to show good results. Magnesium alloys tend to burn in pouring, but by incorporating a mixture of sulphur and potassium fluoborate in the sand-resin mix, some success has been reported.

Industry will not derive the maximum benefits from shell molding until improved methods of making shell cores are in use.

#### **Two ways to make cores**

Shell cores can be produced by blowing or dumping a sand-resin mix into a heated core box. The core box must have a means of ejecting the cured core. In blowing, the mix is injected into the hot core box at about 30 psi for 6 to 10 seconds. Pressure is removed and the loose mix falls away. In dumping, as in making molds, the mix falls onto the hot surface, but with a slightly longer time cycle. The core is then cured, ejected and is ready to use.

Dumping has proved more successful in making shell cores. Resin tends to break away from the sand under the pressure of blowing resulting in weak spots, rough finish, and breakage. While dumping produces a good core, its applications are limited. It is very difficult to produce a sudden decrease in diameter by this method since the mix will not bond upwards. It is possible to dump in sections but ridges produced reflect in the casting.

# How Austenitizing Conditions Affect Medium Alloy Steels

♦ Austenitizing temperature strongly influences the amount of retained austenite in 9395, 4695 and 8695 steels . . . Both austenite composition and Ms temperature can be controlled through manipulation of austenitizing temperature . . . Amount of retained austenite increases as austenitizing temperature is raised until the Acm temperature is attained.

By A. R. Troiano, Head and R. F. Hehemann, Assistant Professor  
Dept. of Metallurgical Engineering  
Case Institute of Technology, Cleveland

## Part II

♦ RETENTION OF AUSTENITE in heat treated steels in general, and in the case of carburized low carbon steels in particular, is a matter of considerable interest and importance. In this study of three medium alloy steels—4695, 9395 and 8695—the amount of retained austenite was determined by the lineal analysis method. In some instances, this was checked or extended to the region of small amounts of retained austenite by the X-ray method.<sup>6</sup>

The facility with which austenite composition and Ms temperature can be controlled through manipulation of the austenitizing temperature is reflected in a similar and advantageous control over austenite retention. The effect of austenitizing temperature on the amount of austenite retained at room temperature is presented in Fig. 7.

It is apparent that the amount of retained austenite increases as the austenitizing temperature is raised until the Acm temperature is attained. For these steels, austenitizing temperatures above Acm have no effect on the amount of austenite retained at room temperature.

The powerful influence of austenitizing temperature is especially striking; for example, in 9395 a change of 200°F, from 1700°F to 1500°F, will decrease the austenite retained from almost 50 pct to less than 10 pct. It is particularly significant to note the behavior of 9395 relative to that of 4695 and 8695. Potentially, this steel can retain twice as much austenite as 4695 or 8695; nevertheless, with an appropriate austenitizing treatment, the retention of austenite in 9395 can be reduced to the same level as that in either of the other two steels.\*

This behavior results, in part, from the high Acm temperature of 9395. Thus, for the same

austenitizing temperature a relatively higher carbon austenite is formed in 4695 and 8695 than in 9395. The exact carbon contents are specified in Fig. 1 (See Part I, THE IRON AGE, Nov. 11, 1954). Here the slopes of the curves for all three steels are about the same. On the other hand, the fact that the slopes of the curves of Fig. 7 for the three steels are not the same indicates that the retention of austenite is controlled by other factors in addition to carbon content of the austenite.

The curves of Fig. 8, where retained austenite is plotted as a function of carbon content, clearly reveal that the retention of austenite is largely but not completely controlled by the carbon content. Thus, for a given reduction in carbon content (resulting from undissolved carbides) a greater reduction in austenite retention takes place in 9395 than either

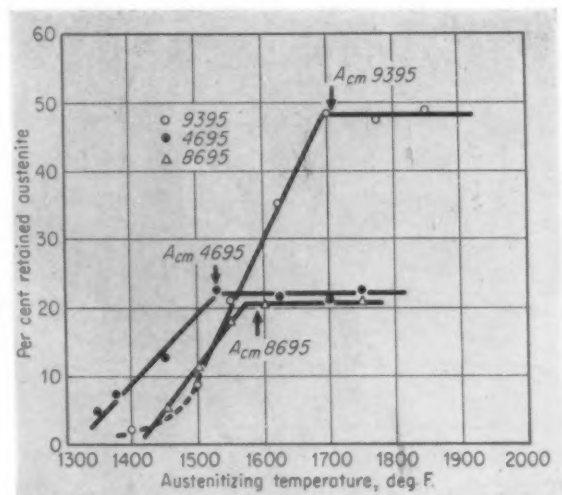


FIG. 7—Effect of austenitizing temperature on amount of austenite retained at room temperature.



## "Retention of austenite may not always correlate well with the $M_s$ temperature . . ."

4695 or 8695. This may signify that the relative distribution of alloy between the austenite and the undissolved carbides is not the same for 9395 as for 4695 and 8695. This can be accomplished without relative sacrifice of hardness or of the hardenability advantage that 9395 enjoys over 4695 or 8695.

The influence of  $M_s$  in controlling the amount of retained austenite is illustrated in Fig. 9. Contrary to common belief, the retention of austenite may not always correlate well with the  $M_s$  temperature. For example, from Figs. 7 and 9, 9395 austenitized at 1550°F will retain 20 pct austenite with  $M_s$  at 260°F—on the other hand, 4695 austenitized at 1515°F will also retain approximately 20 pct austenite, but with  $M_s$  at 340°F. Although an approximate correlation exists between  $M_s$  and amount of retained austenite, factors of secondary importance appear to interfere with the quantitative development of this correlation.

The influence of austenitizing temperature on as-quenched hardness is shown in Fig. 10. For each of the steels, the as-quenched hardness was independent of austenitizing temperatures above  $A_{cm}$ . In this temperature range, the as-quenched hardness differs considerably among the three steels.

Hardness was increased as the austenitizing temperature was lowered below  $A_{cm}$  and, with this, the amount of retained austenite reduced, Fig. 7. The sharp drop in hardness after austenitizing in the temperature range 1325°F to 1375°F may be correlated with the appearance of ferrite at the austenitizing temperature. This upper temperature limit for the three-phase field is indicated by arrows in Fig. 10.

By appropriate choice of austenitizing temperature, each of the steels can be treated to obtain an as-quenched hardness of RC 65-67.

Retained austenite in each of these steels can be reduced to an acceptable level without sacrifice in hardness from loss of carbon associated with a very low austenitizing temperature.

Austenitizing temperatures below  $A_{cm}$  may appreciably influence hardenability of high-carbon steels. The effect of austenitizing temperature on the pearlite and bainite transformations was investigated at one isotherm for each reaction. The manner in which austenitizing temperature determines the time for initiation and completion of transformation at the pearlite nose temperature is shown in Figs. 11 and 12. Times for initiation and completion of transformation at the bainite nose temperature are summarized in Figs. 13 and 14.

### Carbides accelerated transformations

It is apparent from Figs. 11 to 14 that the presence of undissolved carbides accelerated both the pearlite and bainite transformations. However, the two types of reactions respond to the presence of undissolved carbides quite differently. Comparison of Figs. 11 and 13 demonstrates that low austenitizing temperatures produce a less marked reduction in the induction period of the pearlite transformation than in that of the bainite transformation.

Figs. 12 and 14 reveal that the completion times are affected in a similar manner. This behavior probably results from the interaction of two factors: (1) The effect of austenite chemistry, particularly carbon content, on the rates of the pearlite and bainite transformations. (2) Ability (or inability) of undissolved carbides to nucleate these transformations.

In the absence of undissolved carbides, reduction in carbon content of austenite lowers the rate of the pearlite transformation." Undissolved carbides, on the other hand, nucleate the pearlite transformation and thereby increase its rate. It appears, therefore, that the effect of austenitizing temperature on the rate of the pearlite transformation results from a balance between these two factors.

At austenitizing temperatures slightly below

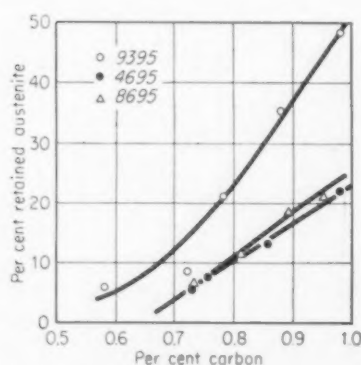


FIG. 8—Effect of carbon content on retention of austenite in 9395, 4695, and 8695 steels.

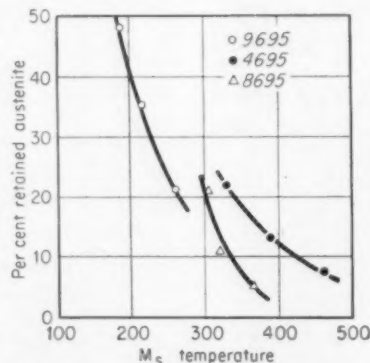


FIG. 9—Effect of  $M_s$  on the amount of retained austenite in 9395, 4695 and 8695 steels.

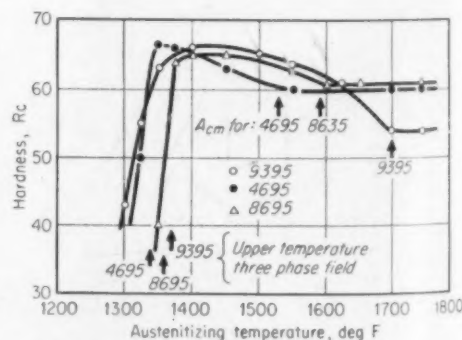


FIG. 10—Effect of austenitizing temperature on hardness of quenched structure.

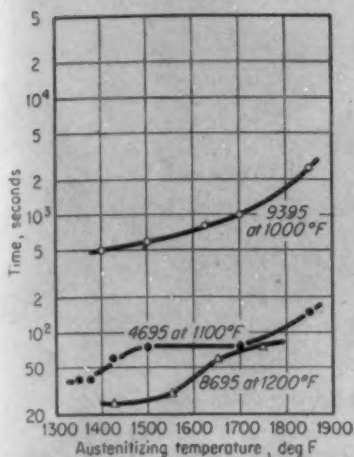


FIG. 11—Effect of austenitizing temperature on the induction period at the pearlite nose.

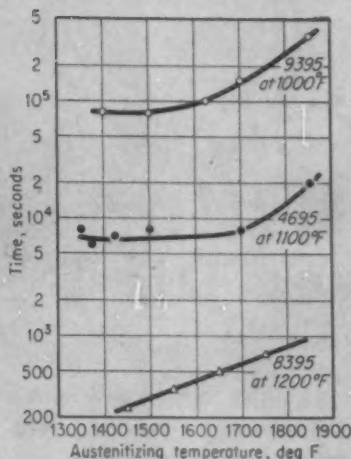


FIG. 12—Austenitizing temperature effect on time for reaction at pearlite nose.

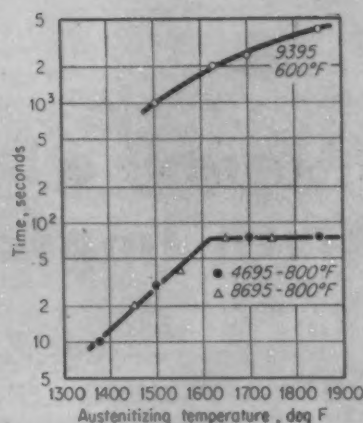


FIG. 13—Effect of austenitizing temperature on the induction period at the bainite nose.

Acm, the amount of undissolved carbide is small and, as a result, the carbon content of the austenite is not severely affected. The nucleating effect of the undissolved carbides, therefore, overshadows the retarding effect of lowered carbon content and the transformation is accelerated. As larger amounts of carbon are removed from solution by further reduction of austenitizing temperature, the retarding effect of lowered carbon content is revealed in the lessened tendency toward acceleration of the pearlite transformation.

In contrast to this, a reduction of carbide content of austenite severely accelerates the bainite transformation. Although little is known concerning the influence of undissolved carbides on nucleation of the bainite reaction, their effect probably is negligible. It would thus appear that reductions in austenitizing temperature should continuously accelerate this transformation. The data of Figs. 13 and 14 support this argument.

The data presented in Figs. 11 to 14 reveal that 9395 possesses a hardenability advantage over the other two steels which is maintained at all austenitizing temperatures. This is expressed more clearly in the end-quench hardenability curve of Fig. 15 for an austenitizing temperature of 1475°F. The ability of 9395 to maintain its hardenability advantage over 4695 and 8695 implies that this steel may be austenitized at sufficiently low temperatures to reduce its retention of austenite to the same order as that for the lower alloyed steels. Fortunately, as demonstrated in Fig. 10, this may be accomplished without loss of as-quenched hardness.

#### REFERENCES

5. B. L. Averbach and M. Cohen, "X-ray Determination of Retained Austenite by Integrated Intensities," *Trans AIME* (1948), Vol. 176, p. 401.
6. T. Lyman and A. R. Troiano, "Influence of Carbon Content Upon the Transformation in a 3 Percent Chromium Steel," *Trans ASM* (1946), Vol. 37, p. 402.

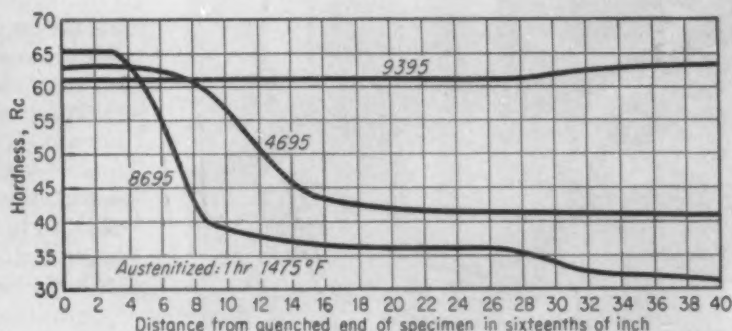
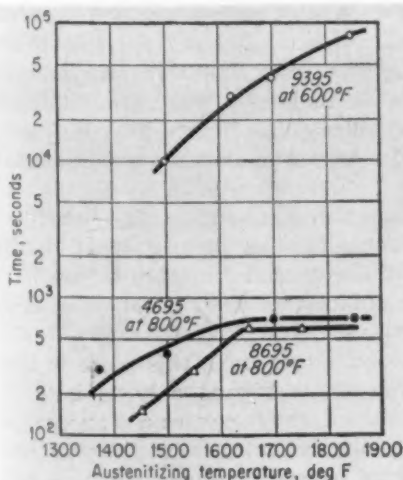


FIG. 14—Effect of austenitizing temperature on time for reaction completion at bainite nose.

FIG. 15—End quench hardenability response of steels austenitized at 1475°F.

## Minimize Distortion With Improved Die Design

♦ Modern press quench methods make it possible to hold close tolerances on precision parts during heat treating . . . But to get maximum advantages from this method, dies must meet requirements peculiar to the process and to the parts.

♦ Dies must permit proper flow of quench, and be constructed to prevent parts from distorting during quenching . . . Angular relationships and dimensions of complex parts can be held to close tolerances when dies are properly designed.

By R. V. Adair,

Chief Metallurgist, Gleason Works, Rochester, N. Y.

♦ **AUTOMATIC**, controlled die quenching makes it possible to hold close tolerances during heat treating. However, to realize maximum advantage of the process, dies must be designed to have proper flow of quench, to hold



**PRESS QUENCH DIE** for ring-shaped pinion carrier has both contracting and expanding segments to hold pin parallel with axis of ring.

all critical dimensions of the part during the quenching cycle, and must be built to exceptionally close tolerances.

An excellent example of the problems encountered in designing dies for use in modern quenching presses is found in dies required for quenching a flat, ring-shaped pinion carrier for an aircraft planetary reduction gear drive. This and other dies described here were made for use in Gleason quenching presses.

This part was a forging of AMS-62660 or equivalent, having an outside diameter of about 15¾ in. and an inside diameter of about 9 in. Projecting perpendicularly from one face of the ring, parallel with its axis, were 20 pins, about 1 in. in diameter and 1¼ in. long, evenly spaced near the circumference of the ring.

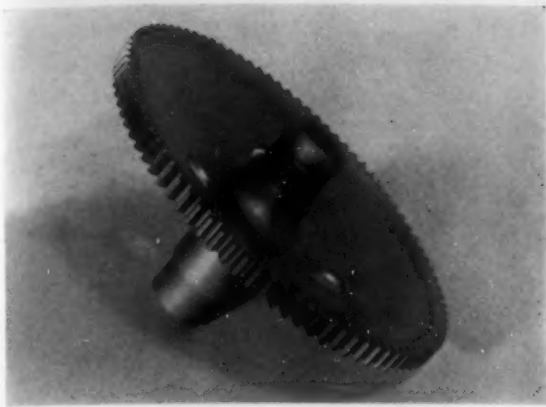
### Pressure on pins was needed

Around the base of each pin was a shoulder forming a thrust face. The radial cross-section of the ring was irregular, with a minimum thickness of ⅛ in. and a maximum thickness of approximately ½ in. Before heat treatment the part was copper plated for selective carburization.

To maintain minimum and uniform stock removal, it was desirable, in heat treating this part, to hold the overall diameter within 0.004 in., and the pins within 0.003 in. of parallelism with the axis.

Initial attempts to quench this piece in relatively simple dies, designed only to hold the ring flat and the bore true, were not successful. It was found this did not prevent the pins from flaring outward from the perpendicular.





**TOLERANCES** were close on this aircraft gear with thin-section web and a long, slender hub. Hub was held perpendicular to web by using removable center plugs in upper, lower dies.

To correct this, a die was built with contracting segments which exerted pressure inward on the pins. This prevented the pins from flaring outward, but it did not correct the deviations, for then the pins curved sideways.

This experience indicated that it would be necessary to design dies that would hold the part at every possible point. Accordingly, a die with both contracting and expanding segments to hold the pins parallel with the axis of the ring was designed. The expanding segments had V-notches at the outer ends. Thus each pin was held firmly by three tangential surfaces during the quenching process.

Segments were made so the center-to-face distance of each could be individually adjusted by the insertion of shims. Controls on the quenching press also provided adjustment in the relative pressures exerted by the contracting and expanding segments.

The most critical phase in building these dies was in machining the keyways. It was necessary to maintain the angular spacing of the V-notches in the expanding segments within  $\pm 0.0002$  in. This required the most careful and precise cutting of the 20 keyways for those segments. Not only did the keyways have to be exactly the right size to guide the sliding segment without binding, and without play, but each keyway had to be a true radius, and the indexing between them had to be highly accurate. The final adjustment in achieving the 0.0002 in. tolerance was made by grinding the face pads of the V-notches.

Another part which posed some unusual problems in die design was an aircraft gear with a thin-section web and a long, slender hub. This gear had an outside diameter of  $7\frac{3}{4}$  in. and the hub was  $4\frac{1}{4}$  in. long. The maximum allowable error was 0.002 in.

The principal problem in die quenching this part was to hold the hub perpendicular to the web. Initially, this was attempted by placing the hub on a plug which was an integral part

of the lower die, and clamping the gear face between the upper and lower dies. It was found, however, that this allowed the upper half of the hub to deflect, and that the required tolerance could not be maintained.

This difficulty was solved by building dies having removable center plugs in both the upper and lower dies. These plugs were held in place in the dies by a snug fit, and were removed from the press along with the quenched part. Dual sets of plugs were supplied so that continuous production could be maintained. The plugs were machined to an accuracy of 0.0002 in. and most other dimensions of the dies to 0.0005 in.

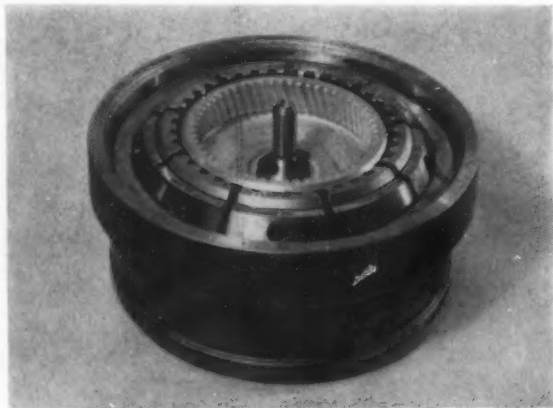
To provide uniform quenching of all portions of the gear it was necessary, because of the length of the hub, to cut channels in the upper die through which the oil flow was directed down over the upper part of the hub and web at the same time that the lower portion was being quenched by the normal upward oil flow.

In die quenching an internal gear for an automatic automobile transmission, the most troublesome problem was tapering of the gear.

This part had an outside diameter of about  $5\frac{1}{4}$  in. and inside diameter of about  $4\frac{1}{2}$  in. The hub was 3 in. long, and had an internal spline. The tolerance on most dimensions of this part was 0.002 in.

In die quenching this part it was necessary to insert a plug into the bore to hold it perpendicular to the web. A guide in the upper die served to center the plug and the gear. Channels were cut in the plug to allow the quenching oil to flow up through the bore, as well as around the outside of the part.

The web and face of the gear were held true by clamping the face of the gear between expanding and contracting segments. Since these exerted equalized pressure on both the interior and exterior faces, they served to overcome tapering.



**TO HOLD HUB** perpendicular to web was problem faced in die quenching this internal gear for automatic transmission. Good die design eliminated distortion, held hub perpendicular to the web.

## Force, Temperature Measurements Rapid Guide to Tool Life Evaluation

♦ Cutting forces and temperatures have been successfully used as a guide in evaluating tool life on gray cast irons . . . Under given operating conditions and with work materials having similar machining properties, the method could be used as a short cut, replacing time consuming wear tests. . . Force and temperature measurements are generally more reproducible than wear measurements.

By **E. A. Loria\*** Senior Engineer, Metallurgy  
The Carborundum Co., Niagara Falls, N. Y.

and

**D. R. Walker,** Asst. Professor, Mechanical Engineering  
Massachusetts Institute of Technology, Cambridge, Mass.

♦ **CUTTING TEMPERATURES** and forces can serve as a guide in the rapid evaluation of relative tool life under given operating conditions and with work materials having basically similar machining properties. The measurements of cutting forces and temperatures require only a few minutes. Wear tests under the same conditions may take hours or days and require much more work material. Force and temperature measurements are generally more reproducible than wear measurements.

Both unalloyed and alloyed gray cast irons were used in the tests designed to show the relationship between tool life, tool temperature, and cutting forces.

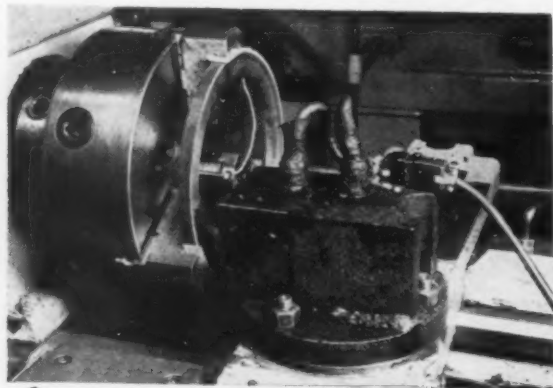


FIG. 1—In tool temperature a gray iron ring was set up in lathe, insulated from the chuck, wired into a thermocouple system. Hot junction is the tool-chip interface.

A cutting tool may fail in three general ways. First, if cutting forces are excessively high, if the tool is brittle, or if there is chatter or intermittent cutting a tool can fail through chipping of the cutting edge or by a complete fracture of the tool tip. Usually tool failures of this first type are limited to cases in which there is poor rigidity of tool or work, or when the tool material is a hard carbide or diamond.

The second type of fracture is a temperature failure. Essentially all the energy input to a metal cutting process is expended in deforming the chip or in friction between the tool and chip. Almost all this energy ends up in the form of heat, and as a consequence the tip of a cutting tool can attain a high temperature. If the rate of energy input to the tip of a tool becomes too large, the tool reaches a temperature where it becomes too soft to function properly and failure occurs. The second type of tool failure generally takes place quite abruptly and is frequently accompanied by sparking.

The third and most common type of tool failure is that produced by gradual wear which usually appears as a wear land along the clearance face of the tool and may be accompanied by a cratering of the rake face. Occasionally a wear crater grows to such an extent that a tool becomes weak and fractures, but in general a tool is considered to have "failed" where

\*Work at MIT was carried out under a Grant-In-Aid sponsored by The Carborundum Co. Mr. Loria is now Staff Metallurgist, Crucible Steel Co. of America, Pittsburgh.

TABLE I

## Chemical Analysis and Hardness of Gray Irons

Iron	TC	Si	CE	Mn	P	S	Ni	Mo	Cr	Brinell
A	3.41	2.19	4.14	0.90	0.09	0.09	....	0.08	0.09	223
B	3.43	2.21	4.16	0.91	0.10	0.10	....	0.08	0.02	223
C	3.36	2.23	4.08	0.91	0.10	0.12	0.75	0.10	0.12	248
D	3.38	2.16	4.10	0.88	0.08	0.09	....	0.59	0.38	293

the wear land on the clearance face has attained an arbitrary length.

Gradual wear is due in part to plowing or gouging of the tool by carbides or other hard particles in the work material, and in part to the loss of tool material from the breaking of welds which form between tool and chip, or work, as the work and chip slide along the tool. Welding wear is promoted by clean surfaces, high pressures, and high temperatures, all of which are present in the cutting process. High temperatures also serve to increase tool wear by softening the tool and thus causing a larger proportion of the welds to break within the tool material.

The experiments reported here are concerned with tool wear of the gradual type. Under constant conditions of speed and feed, tool life decreases with increasing cutting forces and temperatures. These results are in agreement with the aforementioned wear mechanism. An

increase in cutting forces generally means an increase of pressure between work and tool if other conditions are kept constant. An increase in cutting forces also serves to increase the rate of energy input to the tool and thus to raise its temperature.

An increase in cutting forces does not always mean a decrease in tool life. For example, tool life is often improved in the cutting of mild steel and many nonferrous materials if the work material is in a cold worked state. Cold working tends to increase cutting forces, but also tends to improve the cutting process by decreasing the amount of chip deformation and reducing the tendency of a built-up edge to form on the tool.

A tool life test on cast iron rings has been devised which closely simulates the machining conditions found in critical sections of commercial castings. In this test facing cuts are made on test rings of 7 in. ID, 9 in. OD and 1/2 in. thickness at a certain speed, and tool life is determined by measuring the wear on the flank of the carbide cutting tool. Such tests have been extended to include the relative machinability of unalloyed and alloyed irons having the same base chemistry.

Some of these irons have been used in the present study of correlating tool life with tool temperature. These tool life studies on machining the as-cast surface to a depth of 1/16 in. at a speed of 315 fpm provide information on the hard "skin" of cast iron at a sensitive machining speed for carbide tools. The cutting forces and temperatures generated under the same conditions complete the picture of the interrelating factors governing machinability. These measurements have been made by the MIT Metal Cutting Laboratory employing the chip-tool thermocouple technique developed by Shaw and his associates to measure machining temperatures.

Temperature and force measurements were made on the four types of gray iron given in Table I. To provide structural variations that would be expected to produce differential heating effects, unalloyed and alloyed irons were included. Irons A and B were unalloyed while

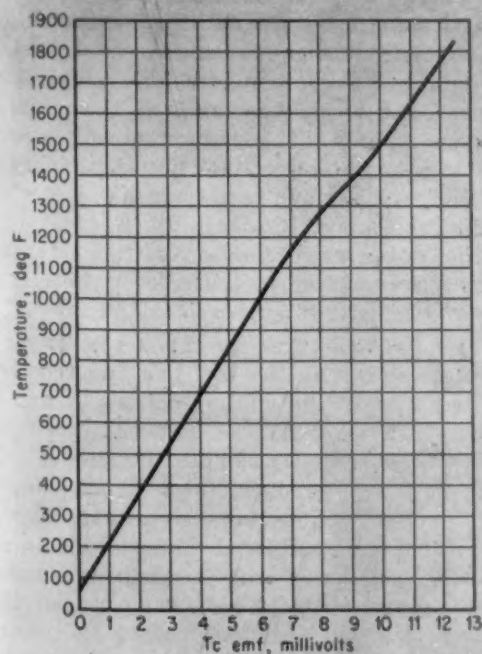


FIG. 2—Tool work thermocouple calibration curve for cast iron vs. K-6 tungsten-carbide thermocouple. Reference junction, 70°F.



iron C had the same base chemistry with a nickel addition to tighten up the matrix structure. Iron D had molybdenum-chromium added to produce an additional hardening effect.

Tungsten carbide tools (K6) having the following geometry were used: Back rake, 0°; side rake, 0°; end relief 5°; side relief, 5°; end cutting edge, 0°; side cutting edge, 0°; nose radius, 0.015 in. In the tool temperature tests facing cuts of 1/16 in. depth at a speed of 315 fpm were made on the rings, the feed per revolution being 0.004 in. The tool was held in a tool post dynamometer which measured the power (tangential) and feed (radial) components of the cutting force. Dynamometer readings were taken with a strain recorder.

Fig. 1 shows a close-up view of a machining test in progress on a lathe. The cast iron ring is held in the chuck, but insulated electrically from it. A wire is attached to the ring and connects to a rod which runs through the head of the lathe and ends in a commutator consisting of a copper disk running in mercury. A lead from this commutator is attached to a recording potentiometer. The other potentiometer connection is to the tool via a ground to the lathe bed. The hot junction of the thermocouple formed in this manner is the tool-chip interface while the cold junction is composed of the potentiometer terminals.

Temperature measurements were made on surface cuts and on cuts made after the surface had been removed. No difference was found in the indicated temperatures perhaps because even on a surface cut most of the material removed can be considered "subsurface" because of the 1/16 in. depth of cut. Reliable force measurements could only be made after the surface layer was removed since the unevenness of the as-cast rings made a uniform depth of cut difficult.

The technique used for the temperature calibration of the cast iron rings vs. the carbide tool was to immerse a portion of tool material

TABLE II

Tool Temperature,  
Force and Wear

Iron	Thermal EMF, mw	Temp. Deg. F	Power Force, lb	Feed Force, lb	Tool Wear*
A	6.5	1075	161	129	12.0
B	6.2	1025	141	125	12.2
C	7.7	1240	181	234	6.3
D	9.6	1440	219	238	4.7

\* Cubic inches of metal removed to produce 0.015 in. wear land, tests made by Battelle Memorial Institute. Data are for facing cuts of 1/16 in. depth at 315 fpm.

and a length of work material in a lead alloy bath along with a standard thermocouple. Thermal voltages produced when the bath was heated and cooled were recorded for both the standard thermocouple and the tool material-work material thermocouple. A cross plot was then made using the known emf-temperature relationship of the standard thermocouple.

Tool-work thermocouple calibration curve is shown in Fig. 2. The curve takes a slight bend at about 1350°F. This bend may be perfectly natural, or it may be due to an allotropic transformation in the cast iron. If such a transformation does occur at this temperature it most likely would not occur in cutting because of the rapidity of heating in the cutting process.

The results of cutting force and temperature measurements on the cast iron rings are given in Table II, together with the tool life data obtained previously. Under the same machining conditions it can be seen that there is a good correlation in the data. As expected, the unalloyed irons A and B were the most machinable and had the lowest force and temperature values. The nickel bearing iron C had intermediate values. The chromium-molybdenum iron D gave the lowest tool life and generated the highest force and temperature values. The results, shown graphically in Fig. 3, confirm the opinion that lower forces and temperatures often mean greater tool life, even in a free-machining material such as cast iron.

The microstructures for this series of rings correlate well with the tool life and temperature results. In the unalloyed irons A and B, varying amounts of large patches of primary ferrite are observed in the pearlite matrix. The nickel in Iron C produces little if any primary ferrite and refined the lamellar pearlite matrix as a whole. The strong carbide-stabilizing effect of chromium in Iron D produces primary carbide grains (5 to 10 pct) which reduce tool life significantly. In effect, both tool life and temperature are benefited by more ferrite in the microstructure, a coarser pearlite spacing, and the elimination of even small percentages of carbide particles.

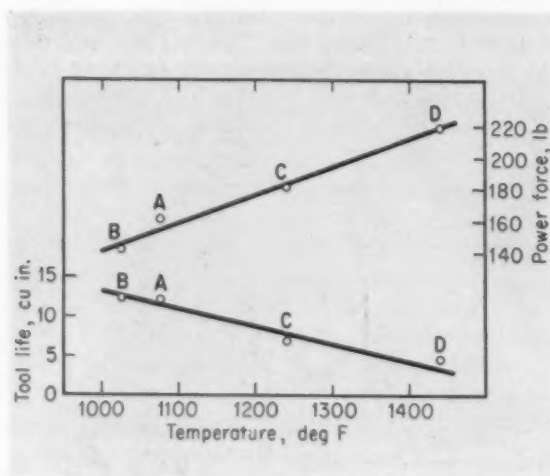


FIG. 3—Tool life and power force vs. tool temperature for irons A to D. Conditions: 315 fpm speed, 1/16 in. depth of cut, 0.004 ipr feed.

National Metal Show

## INDUSTRY: Spotlights Methods, Equipment Designed to Cut Costs, Increase Output

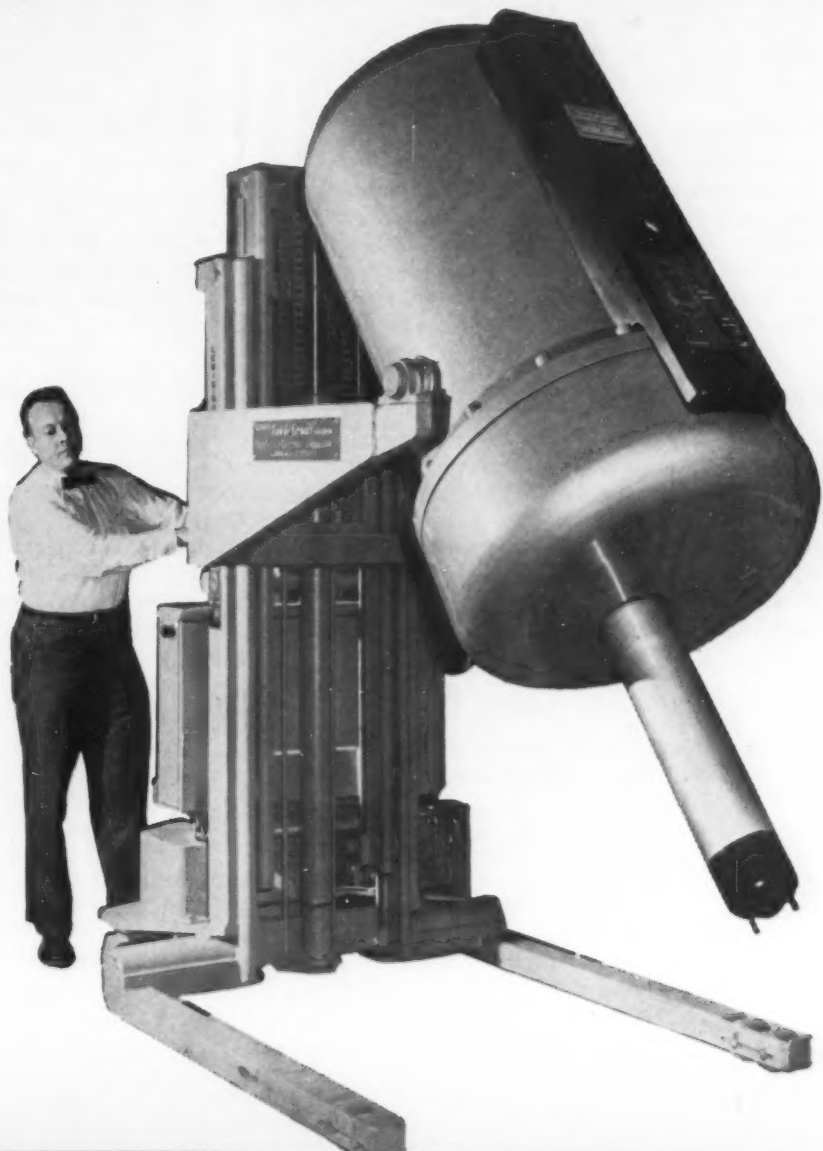
◆ Bigger and brighter than ever, the 1954 annual Metal Show and Congress held in Chicago, drew some of the largest crowds in its 36 year history . . . Many new production ideas, materials, equipment were presented to engineers, production men and business executives in technical sessions and at the show.

◆ New uses for ductile iron at elevated temperatures are foreseen . . . High speed percussion welding gives strong, accurate welds . . . Hardness tester sorts parts, can be built into automated production line.

◆ SPARKLING DISPLAYS and live exhibits set the tone at this year's metals market place as industry turned the spotlights on many new and improved products. Materials, processes and machines vied for attention before throngs of engineers, production men, designers and executives.

Exhibits at the 1954 Metal Show in Chicago's International Amphitheater were bigger, brighter

ONE-MILLION  
volt X-ray machine  
can penetrate  
1½-in. thick  
steel in less than  
1 minute.



## **"More exhibits on vacuum melting were shown this year . . ."**

and more attractive than ever. Keen interest was displayed as prospective buyers and visitors crowded into booths to learn more about the cost-saving, production-boosting items, many of which were shown for the first time. Established products generated a great deal of interest as exhibitors came up with new wrinkles on lower operating costs, faster speeds and different uses.

Experts on these items managed to get a serious technical story across with solid facts and convincing performance. To prove their messages and whet buyers' appetites, machines were put through their paces as they flipped, flopped, whirled and turned at peak performance.

Spurred by the desire to expand their field of activity, some equipment producers stepped into

the tough competition by exhibiting for the first time products and machines closely related to their more seasoned lines. No less than six ultrasonic degreasers were among the wares, indicating the increasing emphasis on a growing process.

Vacuum melting received more attention than at any previous show. One furnace maker, F. J. Stokes Machine Co., operated a vacuum furnace in live demonstrations to produce sample melts up to 10 lb. Other exhibits featuring vacuum metallurgy were shown by Consolidated Vacuum Corp., National Research Corp., Carboloy Dept. of General Electric Co., and Vacuum Metals Corp.

Technical sessions were well attended. Standing-room-only signs were out at the sessions on furnace atmospheres and induction heating. Hundreds listened to the panel discussion on the theory of gases and atmospheres. The subject of

## **TECHNICAL PAPERS**

### **See New High Temperature Uses for Ductile Iron**

Ductile cast irons have established themselves as standard fabricating materials. Now, studies of their creep and stress rupture properties at 800° to 1200°F, indicate these materials will have wide use at elevated temperatures.

Short-term tensile and rupture properties of the pearlitic grade are superior to those of the ferritic grade. Creep properties, correspondingly superior, apply only to about 800°F. At higher temperatures, pearlitic iron, being structurally unstable, graphitizes and reverts to ferritic iron having lower creep strength than standard ferritic iron.

From 800° to 1200°F, stable ferritic iron compares in creep strength to low-carbon steel. The ferritic and pearlitic grades lose strength quickly above 800°F, but the austenitic type is much stronger than either of the other grades at and above 1000°F. In long-term load carrying applications, the standard ferritic and pearlitic grades seem limited to a maximum temperature of 1000° to 1100°F whereas the high-nickel austenitic type should be useful to 1200° to 1300°F.

C. R. Wilks, N. A. Matthews and R. W. Kraft, Jr., Elevated Temperature Properties of Ductile Irons, American Brake Shoe Co.

### **Percussion Welding Gives Strong, Accurate Welds**

Strong, accurate welds, in wire spring type relays have been obtained with a high-speed percussion welding unit. The highly successful method is based on the 50-year-old Vang process. The automatic high-speed machine and the process have been particularly advantageous for welding dissimilar metals.

An important aspect of the process is the ac-

curacy of weld location since contacting surfaces of contacts must be within 0.002 in. of the same plane. The time cycle is so short that thermal and electrical conductivity of the metal have practically no effect on the welds.

A. L. Quinlan, Automatic Percussion Welding of Telephone Relay Contacts, Western Electric Co.

### **Nondestructive Tests Pin Point Sources of Defects**

With improved, nondestructive testing equipment a wide range of defects may be detected at their source. Defects are (1) inherent, (2) the result of processing, or (3) due to fatigue, corrosion, impact or overloading.

Typical of the first class are nonmetallic inclusions in steel, or porosity, gas pockets and slag inclusions in castings. Processing defects are illustrated by the laps resulting from too much or too little metal in the rolls during

rolling. Improper working of the metal in forging may cause laps, fold or cold shuts. Welding, finishing processes, heat treating machinery, and grinding all are sources of defects, each of which is characteristic to that operation. Nondestructive testing can be instrumental in detecting these defects at their source.

C. E. Betz, Sources of Defects Located by Non-Destructive Testing, Magnaflux Corp.



control and safe handling of atmospheres drew considerable interest from an attentive audience.

The sessions on heat treating got down to the details of carburizing, dew point measurement, brazing, carbonitriding, neutral heat treating and sintering. Both the theoretical and practical aspects were treated specifically. Speakers emphasized the advantages and limitations of using heat treating data.

Modern instrumentation and specialized equipment for heat treating operations played a prominent part in discussions which included the experts' recommendations for effective control over furnace atmospheres.

The induction heating sessions provided valuable information to processors on faster heating methods. Keen interest was reflected by members who listened to the latest technological advances in induction heating for melting, brazing, hot forging, forming, extruding and heat treating.



Submerged arc welds 500 disks per hour . . .

## TECHNICAL PAPERS

### Dual-Frequency Heating Cuts Hot-Forging Costs

Dual-frequency heating combines the inherent advantages of high and low-frequency induction heating. Selection of the most suitable frequency or combination will depend on process requirements. Several factors can affect choice: Range of sizes to be handled; availability of space; power costs, specific job requirements.

Dual frequencies are used for continuous processing with results not obtainable by a single frequency. This method of heating is assuming a more important role in hot forging because it offers first-cost economy as well as reduced operating costs.

C. P. Bernhardt, Dual Frequency Heating for Hot Forging, Westinghouse Electric Co.

### Control of Chemistry Improves Screw Stock Machinability

Small differences in chemical composition of screw machine steels can cause considerable variations in machining uniformity. Carbon and silicon have definite adverse effects on the machinability of C-1213 steels, tool life tests have shown.

Oval sulphides aid machinability. Low carbon and silicon contents favor this type of sulphide formation. Higher sulphide content

in rephosphorized openhearth screw stock improves machinability only slightly. Small variations in manganese, phosphorus and nitrogen contents had no apparent effects on machining quality.

E. J. Poliwoda, The Influence of Chemical Composition on the Machinability of Rephosphorized Open Hearth Screw Steel, Jones & Laughlin Corp.

### Weldability of High-Alloy Materials Depends on Techniques

High alloy materials, such as the Ni-Mo alloys, Co-Cr-W-Ni alloys, and N-155, an iron-base alloy with the higher chrome, nickel and cobalt contents, can be welded so that the joints meet the parent metal's minimum tensile requirements. This was determined from tests in which most of these materials were welded by the submerged arc, inert gas-shielded arc and metal arc methods.

All the alloys tested had weld joint properties acceptable for alloys of this type. In general, they can be welded by the same techniques used for the austenitic stainless steels, but certain alloys showed characteristics peculiar to their composition.

One exception is the Ni-Mo alloys which are subject to stress cracking in the hot-short range. Ni-Mo-Cr and Co-Cr-W-Ni alloys work harden during forming, but are not as susceptible to stress cracking during welding as the Ni-Mo alloys. If improper welding techniques are used, microfissuring will occur in N-155 alloy.

Conditions for good welds are generally: (1) minimum weld restraint, (2) keeping base material at about room temperature, (3) good joint alignment and (4) use of stringer beads.

R. P. Culbertson, Weldability of Wrought High-Alloy Materials, Haynes Stellite Co.



A closer look at vacuum melting . . .



Small press has 1200-ton rating . . .

## HIGHLIGHTS OF THE SHOW

### Small, Powerful Press

A new small-sized rubber pad forming press of simple design is expected to find wide application in the forming of small aircraft parts. The press is rated at 1200 tons, has an operating pressure of 5000 psi. Platen area is 12 x 42 in. and has a depth of 3 in. Verson Allsteel Press Co.

### Hardness Tester Sorts Parts

Three colored lights, which signal the relative Brinell Hardness of a test piece, are used to indicate acceptance or rejection of tested parts. When tied in with automatic handling, the new unit can be made to physically sort the work after testing. Steel City Testing Machine, Inc.

### Versatile Induction Hardening Unit

A new vertical-type induction hardening machine has been developed for the continuous and sectional hardening of shafts in size ranges up to 5 in. in diam and 6 ft in length. An electronically controlled variable feeding device permits hardening at selected points on the shaft. Induction Heating Corp.

### Metals, Plastics Combined in Dies

The frequently reported marriage of metal and plastics in experimental metal form dies has now been accomplished. Using kirk-site castings and plastic facing, a savings of 25 pct in time and 40 pct savings in production costs are reported for a luggage compartment cover panel die. Bakelite Co. Div. and Allied Products Co.

### Gamma Camera for 9-in. Thick Steel

Sources up to 500 curies can be accommodated and stored in a new gamma camera using Co 60. The unit weighs about 2400 lb for easy maneuverability through plant areas. The source can be placed in the unit and replaced very simply. It can be used for steel up to 9 in. thick with fair sensitivity. Atomic Energy of Canada, Ltd.

### Hot Extrusion Shows Fast Growth

The American hot extrusion industry is growing up fast. A number of new products that could not be pierced can now be produced to close tolerances by hot extrusion. Alloys being hot extruded into tubing include a number of heat and corrosion resisting, highly alloyed materials as well as titanium. Babcock & Wilcox Co.

### X-ray Unit Mounts on Lift Truck

An economical, transportable industrial X-ray unit with a 1-million volt generator enables sharp radiographs to be produced even under confined conditions. The unit is self-contained in a 36 x 50-in. pressure vessel which can be mounted conveniently on a fork lift truck. Exposure time to penetrate 1½ in. of steel is less than 1 minute. High Voltage Engineering Corp.

### Nonacid Flux Reduces Cleaning Time

Nonacid soldering flux, having strong capillary action, carries solder in any position with uniform distribution. It fluxes through oil, grease, oxides and other contaminants without leaving voids or porosity. Joints soldered in tinplate, stainless steel, brass, copper, bronze, monel, silver and aluminum bronze have good strength. Lake Chemical Co.

every grade of ZINC  
for urgent military and  
civilian requirements

# SLAB ZINC



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**SELECT**

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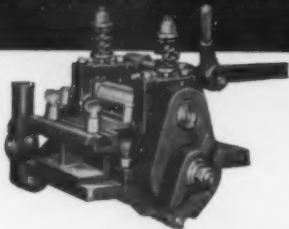
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November 18, 1954

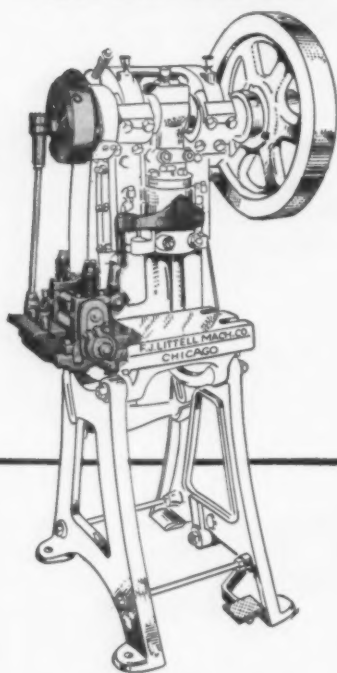


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## FREE AIDS

### New Technical Literature:

#### Small fork truck

This booklet shows how small and medium sized plants can compete with big business in materials handling efficiency. The booklet analyzes the space, time and labor factors involved in small plant operation. Fundamental solutions are suggested. Illustrations, figures and charts show features of design, construction and performance of small power fork trucks for handling materials. *Materials Handling Div., Market Forge Co.*

For free copy circle No. 1 on postcard, p. 173.

#### Insulating materials

Electrical insulating materials are discussed in this new booklet. Varnishes, insulating finishes, varnished cloths and tapes, sealing and filling compounds, mica mat insulation and mica insulation are discussed. Each method is described and charts give properties, types and uses. Specifications are included. *General Electric, Laminated and Insulating Products Dept.*

For free copy circle No. 2 on postcard, p. 173.

#### Machine products

Biddle Screw Machine products are the topic of this new booklet. Among advantages stressed are greater accuracy, lower unit cost, and greater savings. Testing, gauging and checking equipment are covered. "On - the - job" pictures show Biddle services in action. *Biddle Screw Products Co.*

For free copy circle No. 3 on postcard, p. 173.

#### Rotary files

Heller rotary files are the topic of this booklet. Hand-cut, and ground-from-solid high-speed steel rotary files are discussed. Carbide burrs are also covered. Complete specifications are given in tables. *Heller Bros. Co.*

For free copy circle No. 4 on postcard, p. 173.

#### FOR YOUR COPY

**Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 173.**

#### Conveyor belts

Standard conveyor belt constructions are covered in this new chart. The chart and a data sheet show the characteristics for eight of the most popular ply and material combinations of conveyor belt constructions. Among characteristics shown are theoretical ultimate strength, actual ultimate strength, fastener strength and operating strength with fasteners. *Belting Dept., Quaker Rubber Corp.*

For free copy circle No. 5 on postcard, p. 173.

#### Coil grab

The Dixon coil grab is featured in this bulletin. The grab is pictured and its advantages discussed. Construction features are shown. The grab is shown in operation. A table gives the complete specifications. Special sizes are discussed. *Dixon Automatic Tool, Inc.*

For free copy circle No. 6 on postcard, p. 173.

#### Melting furnaces

Chief Sandusky's products are the topic of this folder. The range of compositions and products available at Sandusky is discussed. Among products are ferrous and non-ferrous centrifugal cylindrical castings for all phases of industry, including special purpose castings, resistant to wear, abrasion, corrosion, and heat. Research and control are also covered. *Sandusky Foundry & Machine Co.*

For free copy circle No. 7 on postcard, p. 173.

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ON AGE

## Catalogs & Bulletins

### Resistance welding

This booklet covers several case histories of single-phase electric resistance welding equipment in various fabricating and manufacturing plants. It gives interesting techniques made possible with small, standard, low-cost Sciaky welders. *Sciaky Bros., Inc.*

For free copy circle No. 8 on postcard, p. 173.

### Crane shovel

This new catalog describes the many design and construction features of a recently announced low-weight, low-price 1½ yard crane shovel. It is packed with machinery and parts pictures showing many of the modern advanced designs and improvements in this convertible excavator. Of particular interest is the adaption of self-energizing, shoe-type clutches for swing and hoist. *Bay City Shovels, Inc.*

For free copy circle No. 9 on postcard, p. 173.

### Products

Information on Kaiser Aluminum mill products and services is given in this bulletin. Data on aluminum alloys, forms, properties, applications and availability are given. Condensed tables and charts provide reference material. *Kaiser Aluminum & Chemical Sales, Inc.*

For free copy circle No. 10 on postcard, p. 173.

### Speed reducer

The Brad Foote Gear Works, Inc., herringbone and spiral bevel-helical speed reducer line is covered in this new catalog. Instructions for choosing the speed reducer needed and ordering instructions are given. The equipment is pictured and discussed. Features are pointed out. Complete specifications are included. *Brad Foote Gear Works, Inc.*

For free copy circle No. 11 on postcard, p. 173.

Turn Page

November 18, 1954

# It's the Finish that Counts



*Roto-Finish* COMPOUNDS  
AND CHIPS ARE MADE TO GIVE YOU  
THE PROPER FINISH ECONOMICALLY



There are other brands of materials that resemble Roto-Finish chips and compounds . . . but only Roto-Finish chips and compounds give you the *extra advantage* of continuous research by the company who originated the Roto-Finish processes. Roto-Finish chips and compounds are carefully manufactured so *you* obtain the best results on *your specific job*. To obtain the best results at the lowest cost . . . insist on ROTO-FINISH chips and compounds.

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"Maverick" usually spells trouble, on the production line as well as out on the range. Being an unknown quantity or a "Johnny-come-lately," it leaves room for genuine doubt both as to performance and to quality. And that's the reason so many experienced buyers—production experts to supervisors—insist on Kester . . . the one "brand" that is synonymous with the best in solder and solder products.

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## FREE TECHNICAL LITERATURE

### L. V. reports

Stevens L. V., or Laboratory-Verified, reports and how they can be used to aid metal finishing job shops or the metal finishing department in larger plants, are the topic of this bulletin. Successfully solved metal finishing problems are listed. Copper, nickel, stainless steel and plastic buffing are also covered. *Frederic B. Stevens, Inc.*

For free copy circle No. 12 on postcard, p. 173.

### Engelhard indicator

The Engelhard indicator is featured in this folder. Other products covered are the frictionless galvanometer, switchboard indicator, and taut-suspension galvanometer. The products are described and pictured. Standard scale ranges are given in tables. *Charles Engelhard, Inc.*

For free copy circle No. 13 on postcard, p. 173.

### Lubricant

Sunoco Way Lubricant, a special lubricant for the ways of machine tools, is described in this technical bulletin. The lubricant is compounded to eliminate "stick-slip" or "jumpy table." The lubricant is noncorrosive, has outstanding metal-wetting and adhesive properties and excellent extreme-pressure qualities. *Sun Oil Co.*

For free copy circle No. 14 on postcard, p. 173.

### Products bulletin

The features and uses of Barry's type 5200 shock and high vibration isolators are described in this bulletin. Information on the load ranges of the Series 5200 mounts is given. The mounts are designed primarily as shock isolators for application in the marine, transportation and industrial fields. Complete specification data are given. *Barry Corp.*

For free copy circle No. 15 on postcard, p. 173.

### Light measuring

Process control through quantitative light measurements or color comparison is described and illustrated in this data sheet. Technical details and specifications of the Colorede computing flicker photometer with Brown Elektronik instrumentation are given. *Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 16 on postcard, p. 173.

Turn to p. 170



Controlled Power

INCERSOLL

INCERSOLL

Controlled cutting power is provided by unit-cooled d-c motors. Torque and speed of this boring mill for diesel engine blocks is maintained at optimum point for long tool life and top production.

## help make production automatic

### DC MOTORS STEP UP PRODUCTION THROUGHOUT INDUSTRY

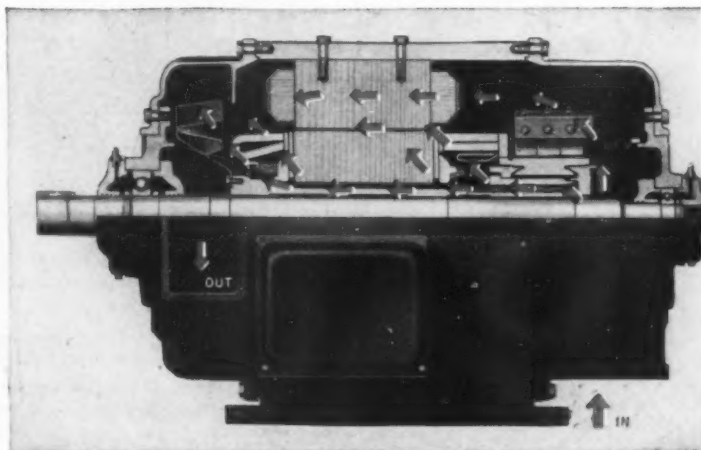
DC drives give you precise control of torque, speed, and power—essential in automatic production. The degree of precision depends on the steady performance and continuity of service of d-c motors and generators. In applications requiring close speed regulation, quick reversing, severe peak loads, G.E.'s complete line of Type CD-1000 motors is:

**ECONOMICAL**—the right speed at all times means less waste, fast production and low manufacturing costs per unit.

**EASY TO MAINTAIN**—built for long life with occasional inspection only—easily removable inspection covers. All connections are enclosed, yet easily accessible.

**VERSATILE**—Today's industry is more automatic than ever before. Regardless of application—in steel, paper, machine tool, and many other industries—G-E direct-current motors have gained the reputation of delivering continuous output at lower costs and accurate speeds for peak production.

**FOR MORE INFORMATION**, contact your nearest Apparatus Sales representative, or write for bulletin GEA-5497, general-purpose d-c motors, or GEA-6091A, totally-enclosed unit-cooled d-c motors. Section 810-4, General Electric Co., Schenectady, N. Y.



Excellent ventilating system gives positive ventilation to entire motor. Shaft fan on armature helps dissipate heat and keeps motor within rated temperature rise.

GENERAL  ELECTRIC

# New G-E TRI 55 CLAD Motors

REG. U.S. PAT. OFF.

## NOW AVAILABLE THROUGH 10 HP!

**Prompt Service, Quantity Shipment on these new motors...**

**TRI/CLAD '55' MOTORS—3-PHASE, 60 CYCLES, NEMA DESIGN B**

HP	3600 RPM	1800 RPM	1200 RPM	900 RPM
1/2				K182 220/440v*
3/4			K182 220/440v*, 550v	K184 220/440v*
1		K182 208v, 220/440v*, 550v		
1 1/2	K182 220/440v*, 550v	K184 208v, 220/440v*, 550v	K184 220/440v*, 550v	K213 220/440v*
2	K184 220/440v*, 550v	K184 208v, 220/440v*, 550v	K213 220/440v*, 550v	K215 220/440v*
3	K184 220/440v*, 550v	K213 208v, 220/440v*, 550v	K215 220/440v*	K254U 208v*, 220/440v*, 550v*
5	K213 220/440v*	K215 208v, 220/440v*	K254U 208v*, 220/440v*, 550v*	K256U 208v*, 220/440v*, 550v*
7 1/2	K215 220/440v*	K254U 208v*, 220/440v*, 550v*	K256U 208v*, 220/440v*, 550v*	
10	K254U 208v*, 220/440v*, 550v*	K256U 208v*, 220/440v*, 550v*		
15	K256U 208v*, 220/440v*, 550v*			

**...and fast delivery on Sample Motors through 20 hp!**

7 1/2				284U 208v*, 220/440v*, 550v*
10			284U 208v*, 220/440v*, 550v*	286U 208v*, 220/440v*, 550v*
15		284U 208v*, 220/440v*, 550v*		
20	284U 208v#, 220/440v#, 550v#	286U 208v*, 220/440v*, 550v*		
25	286U 208v, 220/440v, 550v			

\* Indicates totally-enclosed motors also available.

# Dripproof only, TEFC available in 286U frame.

All motors obtainable with NEMA "C" face and "D" flange end shields, foot mounted or round frame. Splashproof motors in all ratings.

Motors can also be obtained for 50 cycles. 254 and 256 frames available in high starting torque or high slip NEMA designs C or D, except 3600-rpm motors.

There is prompt service on specials in the above sizes, too! Also new Tri/Clad '55' single-phase, wound-rotor, and hermetic motors are available.

If you wish the G-E Tri/Clad motor in the original design, they are still available . . . in ratings listed above and in ratings to 2000 hp.

To get even more recent availability information on standard and special motors, contact your nearest G-E Apparatus Sales Office or G-E motor supplier. *General Electric Co., Schenectady 5, N. Y.*

648-22

**GENERAL  ELECTRIC**

### FREE TECHNICAL LITERATURE

#### Power groover

Niagara's new Model 48-U Universal Power Groover is presented in this bulletin. This machine is built for closing both single and Pittsburgh lock seams. Also shown and described are several other machines available to meet a wide range of grooving and seaming requirements. Complete specifications are included. *Niagara Machine & Tool Works.*

For free copy circle No. 17 on postcard, p. 173.

#### Precision boring

Simplified precision boring of large parts with Hydro-Borer "packaged" boring units is covered in this bulletin. Precision boring can be built right into production set-ups. Accuracy and chatterless feed are obtained through a patented principle of positive feed by oil displacement. *Hydro-Borer Co.*

For free copy circle No. 18 on postcard, p. 171.

#### Protective clothing

Aluminized asbestos protective clothing is featured in this new folder. Special protective garments are described and illustrated. Swatches of aluminized asbestos have been tipped on to the cover of the folder. Among items described are hoods, gloves, and coveralls for the industrial worker; turnout coat, hood, and rescue suit for fire department use; and a rescue kit for truckers, police cars, and ambulances. *Industrial Safety Specialties Co.*

For free copy circle No. 19 on postcard, p. 173.

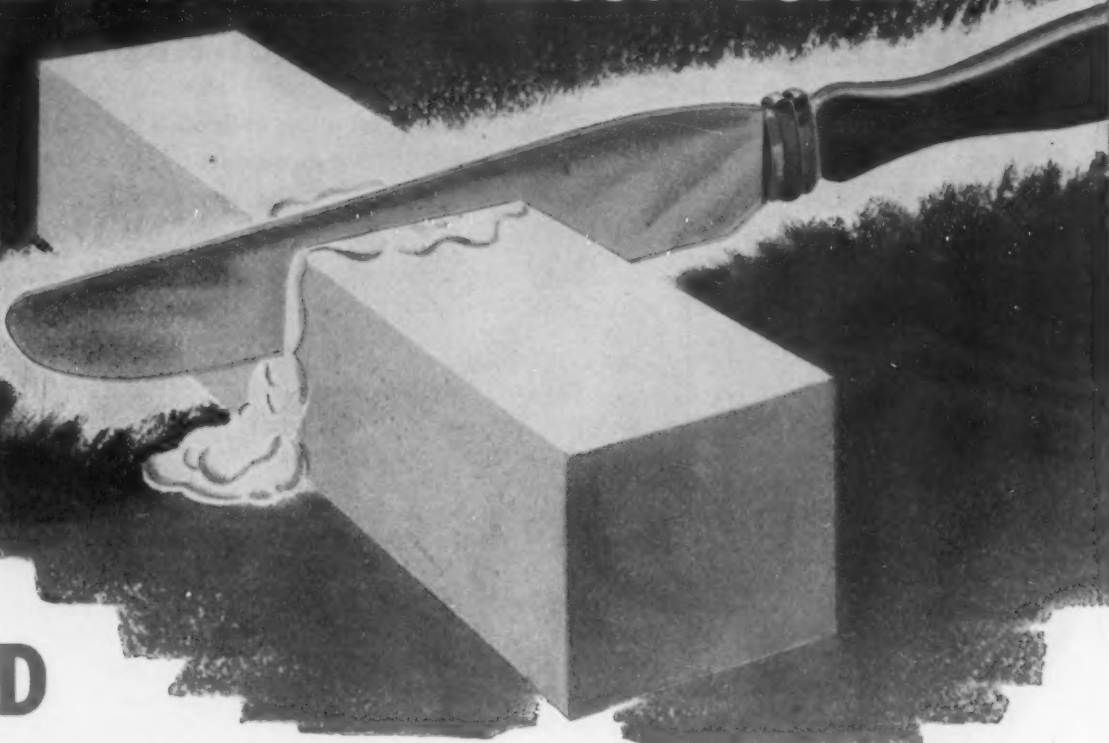
#### Special parts

The special parts made by John Hassall, Inc., are featured in this new Decimal Equivalent Chart. The company makes rivets, nails, screws, threaded blanks, and all types of special fasteners. The parts are cold headed products, stronger and less expensive than parts produced by other methods. The chart gives decimal equivalents from 1/32 to 1 in. *John Hassall, Inc.*

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Turn Page

LIKE A HOT KNIFE THROUGH BUTTER...



# LEAD TREATED ARISTOLOY CUTS CLEAN AND FAST

"Machine tool production increased 35 to as much as 75 per cent"—users of leaded steels report. The addition of lead acts as a lubricant reducing friction between chip and tool. The beneficial results—faster machining speeds—much longer tool life—and vastly improved product finish. With normal heat treating, mechanical properties such as yield strength, tensile strength and ductility are unaffected.

You can obtain similar manufacturing benefits by specifying Aristoloy *leaded* alloy or Ledloy\* (leaded) carbon grades. Available in all A.I.S.I. or S.A.E. standard analyses—write or call today for information about application of free cutting leaded steels to your products.

\*Inland Ledloy License

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**COPPERWELD STEEL COMPANY**  
(STEEL DIVISION)

WARREN, OHIO

For export—Copperweld Steel International Company, 117 Liberty Street, New York

November 18, 1954



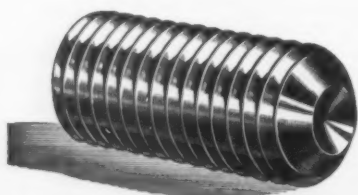
## The Shaft Shows the Holding Power of Allenpoint Set Screws



Loosen a set screw and look at the shaft it's pressing against. The set screw must make a full circle impression with no rough edges in order to give maximum holding power.

Allenpoint Set Screws drive smoothly and deeply into the shaft. Their even bearing surface gives increased resistance to rotation and sliding motion. Even on shafts of small diameter, Allen's smaller cup point assures top holding power.

Sold only through leading  
Industrial Distributors—specify Genuine  
Allenpoint Set Screws



**ALLEN**  
MANUFACTURING COMPANY  
Hartford 2, Connecticut, U. S. A.

## PILING: Metal Replaces Wood

Sheet steel piling cells used by Jones & Laughlin to cut maintenance on old wooden docks . . . Cells driven to bed rock, filled with sand, gravel and capped with concrete.

One large steel company expects to cut dock maintenance and improve barge loading and unloading facilities by replacing worn out wooden docks with steel piling.

Based on its experiences with the high and recurring costs of maintaining wooden river docks, the Jones & Laughlin Steel Corp's. Hazelwood, Pa., by-products plant, decided to replace 750 ft of the old wharf with 9 steel sheet pile cells. Two of the 16 ft 1½ in. diam cells were constructed by Dravo Corp. adjacent to an existing coal-handling elevator. The other seven, 13 ft 7 in. diam, also constructed by Dravo, were driven along the dock line spaced on 60 to 75 ft centers.

### Cells Are Connected

Each cell was driven to rock and rises 15 ft 6 in. above normal pool elevation. River sand and gravel were used to fill the cells which were then capped with 18 in. of reinforced concrete. All cells were connected by a 4-ft wide walkway constructed of steel grating and double handrails.

To minimize future maintenance, Dravo installed steel fenders on two existing stone piers at the dock. One supports the coal barge unloading equipment and the other is used for loading liquid by-product tar. The fenders consist of steel Z piles,



Steel piles cut costs . . .

### WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 173. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

interlocked and attached horizontally to the wharf line for the length of the piers. The fenders extend from pool elevation to dock top.

Provisions for handling barges were incorporated in the design of the steel pile cells. Mooring rings, bitts and ladders are built in the cell structures. Three stairways are installed to give additional access to the moored barges.

Because water transportation is vital to the operation of J&L's By-Products Coke Plant, interference with river traffic at the dock area was held to a minimum during construction of the new facility.

## Machining:

Contouring lathe requires little operator effort.

An electronically controlled duplicating lathe, being built for Inland Steel's Indiana Harbor plant now under construction, will be able to turn and redress steel mill rolls up to 48 in. diam and 18 ft long. The cutting tool on the lathe is guided by a stylus which follows a flat master template.

The lathe, which will weigh more than 60 tons and have an overall length of 41 ft, is being made by Mackintosh-Hemphill Co., Pittsburgh. Raytheon, Inc., Waltham, Mass., will supply the

electronic contouring equipment, and General Electric Co. will build the main drive motor, auxiliary motors and controls.

#### Step Toward Automation

When completed, the lathe will be capable of machining the most complex shapes in rolls for structural steel with a high degree of accuracy. It uses carbide tools principally. The lathe will reduce operator effort substantially since it will only require supervision. Installation of this lathe will mark another big step toward automation in steel mills.

## Heat Treating:

**Steel plant installs unusual tunnel type furnace.**

Tunnel type furnaces are used primarily, in fact almost exclusively, in the ceramic industry. The hearth of these furnaces is comprised of a series of cars, moving at a slow rate through the furnace. About one year ago, The Timken Roller Bearing Co., Canton, Ohio, at a cost of \$500,000, installed one of the first tunnel type furnaces for use in the steel industry. A second such furnace has just been installed at Timken's Gambrinus, Ohio, plant.

#### Moves At 8 Feet Per Hour

Housed in a sheet steel building 320 ft long, the new tunnel type annealing furnace is charged and discharged by means of a fork lift truck. Special brackets welded to the bottom of the hearth car frame afford the fork lift truck a firm hold under the car.

Moving at the rate of 8 ft per hour, each car is 8 ft long by 6 ft 8 in. wide. Two hearth carloads of tubing and bars per hour are thus



Spotting hearth car . . .

# How would you solve it?



**(1) Production Problem:** To cut unit costs of grinding and polishing stainless steel whip-cream dispenser cans. Nilsen Mfg. Co. had been jobbing out the cans to an outside source, paying a high .08¢ per can, due to old-fashioned methods, labor, material and delivery costs.



**(2) Solution:** A 3M Representative recommended that this Addison, Illinois, manufacturer install the 3M Method, using Grit #180 Resin Bond Belts running over a special contact wheel. Cans to be finished were placed on automatic work holders.



**(3) Results:** An immediate reduction in polishing costs. By installing the 3M Method, and doing the work themselves, Nilsen Mfg. Co. cut costs to only \$.0125 per finished unit . . . a saving of \$.0675 per can! A 3M Representative can help you solve your grinding and finishing problems, too. His services are available without cost.



Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch" Sound Recording Tape, "3M" Adhesives, "Undereal" Rubberized Coating, "Scotch-lite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

#### WANT MORE INFORMATION?

Minnesota Mining & Mfg. Co.  
Dept. 1A-114, St. Paul 6, Minn.

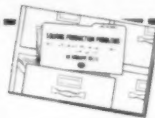
- ☐ Send me free booklet: "Case History Reports on 3M Abrasive Belts"
- ☐ Have 3M Representative Call

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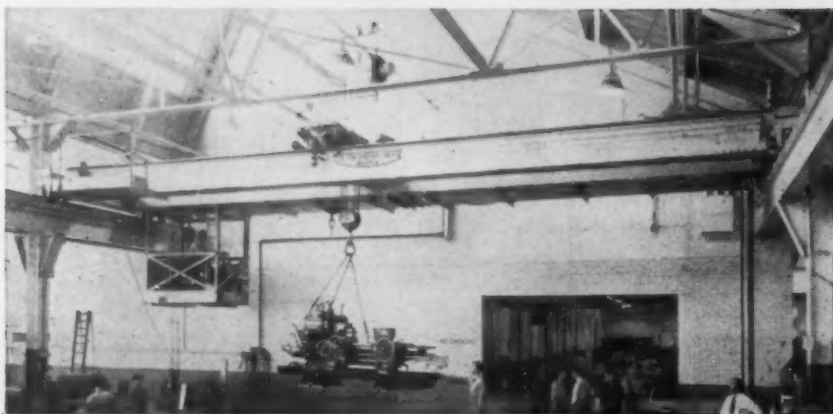
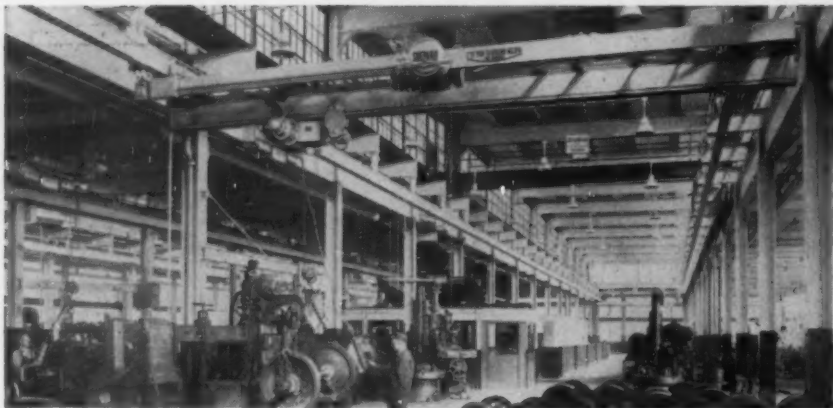
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## Place it there . . . through the AIR



### SHEPARD NILES Crane

● Handling moves slowly at ground level where there are men, material and machinery blocking the way. But up in the air, it's different! Handling is uninterrupted—loads are moved to their destination safely, easily with a Shepard Niles Crane.

● Efficient through-the-air handling can benefit your plant! Let the Shep-

ard Niles representative show you how. The crane he suggests will be one that is engineered to the job you want it to do. And remember: all component parts are designed and built by Shepard Niles specifically for crane operation—your guarantee of years of dependable crane service with a minimum of maintenance.

## SHEPARD NILES

CRANE AND HOIST CORPORATION

SHEPARD NILES CRANE and HOIST CORPORATION  
1442 Schuyler Ave., Montour Falls, N.Y.

( ) Please send me your latest Crane Bulletin.  
( ) Please have a representative call.

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COUPON!

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### TECHNICAL BRIEF



### Furnace discharge end . .

handled by the fork lift truck. Capacity of the new furnace is about 5 tons per hour.

### Pavement Heater

At each end of the furnace is a large sheet steel shed. Discharging end shed measures 60 x 60 ft. while the charging end shed measures 40 x 60 ft. The fork lift truck operates in these two sheds and on a runway 16 ft wide and 340 ft long running alongside the furnace building.

To keep the runway and paved areas free from snow and ice in the winter, radiant heating has been installed. Waste heat from the furnace is used to heat the water and anti-freeze mixture which is used as the circulating medium.

Approximately 8000 ft of pipe have been installed as heating coils in the paved areas and runway. The new furnace, which first went into operation last month is fired by natural gas and uses propane as a standby fuel.

### Prospecting:

Find rich lead-zinc-copper body in Canada.

Discovery of a new Canadian orebody, which may be one of the richest lead-zinc-copper finds of this continent, has been revealed by American Metal Co., Ltd. Uranium strikes may be more romantic these days but a healthy lode of these bread-and-butter metals is just as exciting to the industry.

Incomplete drilling has already indicated 3 million tons of ore averaging 10.5 pct zinc, 4.5 pct lead and 0.5 pct copper as well as



# STOP RUST!

with

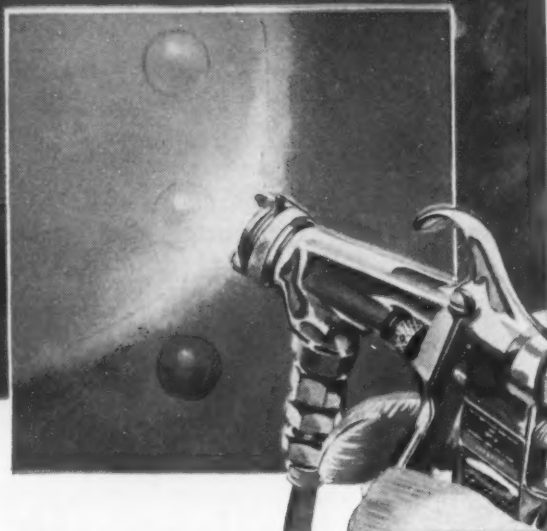
# RUST-OLEUM®

## Beautify As You Protect

Simply brush Rust-Oleum 769 Damp-Proof Red Primer directly over the rusted surface after scraping and wire-brushing to remove rust scale and loose rust. Rust-Oleum's specially-processed fish oil vehicle penetrates rust to bare metal—saving time, money, and metal! Then—beautify as you protect with Rust-Oleum's brilliant array of finish coatings. Specify Rust-Oleum for new construction, maintenance, and re-modeling. See Sweet's for complete catalog and nearest Rust-Oleum Industrial Distributor, or clip coupon to your letterhead . . . and mail today.



**ABOVE:** Applying Rust-Oleum 769 Damp-Proof Red Primer Over Rusted Surface After Scraping and Wire-Brushing to Remove Rust Scale and Loose Rust.



**AT RIGHT:** Applying Rust-Oleum Gray (One of Many Rust-Oleum Colors for Rust Prevention and Decorative Beauty).

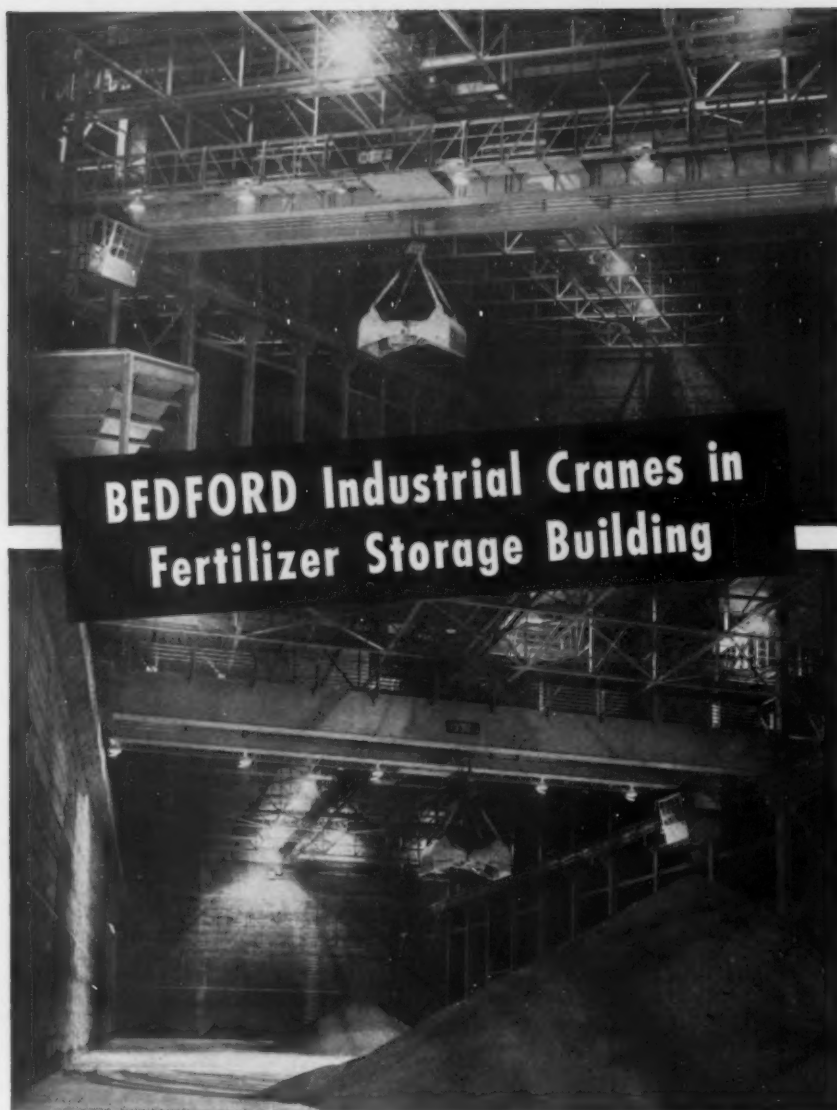
See local classified telephone directory under Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.



There is only  
one Rust-Oleum.  
It is distinctive  
as your own  
fingerprint.

**ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO:**  
Rust-Oleum Corporation, 2564 Oakton St., Evanston, Ill.

- |  |   |
|--|---|
| <input type="checkbox"/> Please Show Me the Rust-Oleum "Rusted Panel Demonstration." | <input type="checkbox"/> Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant. |
| <input type="checkbox"/> Complete Literature with Color Chart.                       | <input type="checkbox"/> Nearest Rust-Oleum Industrial Distributor.                             |



Two 10-ton Bedford Industrial type Bucket Cranes in the storage room at Nitrogen Division of Allied Chemical & Dye Corporation's South Point, Ohio, plant.

Throughout industry important companies are installing Bedford industrial type cranes to cut material handling costs on the *big* jobs.

Typical is the installation illustrated where two 10-ton Bedford Cranes on parallel runways service a 50,000 ton storage area.

Available in sizes from 5 tons to 350 tons for all kinds of service . . . each Bedford Crane is individually engineered for its specific job. Mod-

ern equipment plus advanced methods result in custom quality at production prices.

Why not consult a Bedford engineer on your next crane problem? Learn how you too can profit from Bedford's 52 years of specialized crane application experience.

(Write for complete catalog describing Bedford Cranes in detail.)



New York Office: 280 Madison Avenue  
New York 16, N. Y., Phone MUrray Hill 5-0233  
Pittsburgh Office: Oliver Building, Room 1241  
Phone ATlantic 1-0136

**BEDFORD FOUNDRY & MACHINE COMPANY, INC. • BEDFORD, INDIANA**

0.01 oz of gold and 4 oz of silver to the ton. Another million tons averages 1.90 pct copper, 0.5 pct zinc and 0.1 pct lead as well as smaller traces of gold and silver. Also existing are additional ton-nages of low-grade lead-zinc ore which "will probably be mined eventually."

Ore lies in the Little River Lake area of New Brunswick, about 35 miles northwest of Newcastle. Discovery was made by aerial surveys conducted late last year by International Nickel Co. of Canada, Ltd. This was followed by surface investigation and diamond drilling.

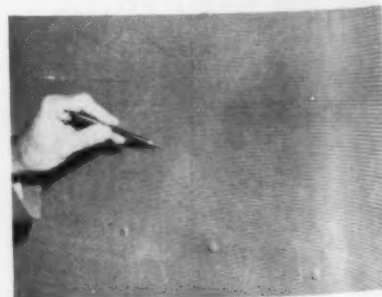
In doing the survey, Inco earned a 25 pct share in the property with American Metal Co. retaining the other 75 pct interest. The latter firm will finance the development and Inco will not share in dividends until all money spent in development and construction of facilities has been repaid.

Construction of roads, the first step in developing the orebody, has already begun. Plans are to get started as soon as possible on construction of a milling and concentrating plant.

## Sound Control:

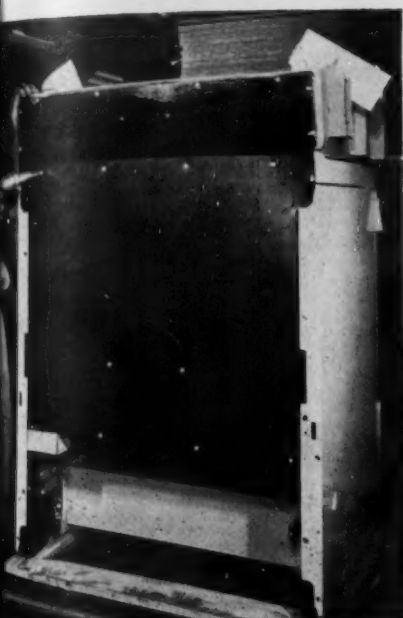
**Silencing devices sap energy of high intensity sound.**

When Ryan's new jet engine test cell roars into action soon, its voice will be hushed by the most advanced silencing equipment which acoustical science has devised. Largest facility of its type in the San Diego area, the new research tool will be used to test



**Perforations, fiber glass . . .**

# Users praise Phillips Cross-Recessed-Head Screws



**TAPPAN RANGES** are built to last for years. "Screws must remain tight over long periods of use," points out Paul N. Smith, Project Engineer. "I don't know of a single case where Phillips screws have failed us in this sense. We now use them exclusively. I can't say enough about their fastening qualities compared with the slotted type. Their greater contact area enables us to apply much greater torque without injury to employees." Ralph Stafford here fastens back panel.



**FRONT PANEL OF A BRYANT MODEL 315 OIL FURNACE** is assembled here by Ronald W. Eary. "All of our applications are metal-to-metal connections," states John Zonza, foreman of the General Assembly Department. "They must be set up extremely tight for rigid construction. With slotted screws, we had to use too much torque to secure a tight fit. This resulted in 'chewed' up heads, and damage to employees' hands. Phillips screws have eliminated this."



**TRACY KITCHEN CABINETS** use Phillips screws on their one movable part: the door hinge. "We have tested other type screws," says B. J. Krywick, general manager, "but decided on Phillips screws because they give us more ease of assembly, greater speed of assembly, more positive contact and driving power. They also eliminate slippage, give us less rejects and enable us to use production methods impossible with other type screws."



**THE FASTENERS  
OF TODAY...  
AND OF THE FUTURE**

**X marks the spot  
... the mark of extra quality**

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Company • The Eagle Lock Company  
Elco Tool and Screw Corporation • Great Lakes Screw Corporation • The H. M. Harper Co. • The Lamson & Sessions Company • National Lock Company • The National  
Screw & Manufacturing Co. • Parker-Kalon Div. General American Transportation Corporation • Pheoll Manufacturing Co. • Rockford Screw Products Co. • Scovill  
Manufacturing Co. • Shakeproof • The Southington Hdw. Mfg. Company • Sterling Bolt Company • Wales-Beech Corp.





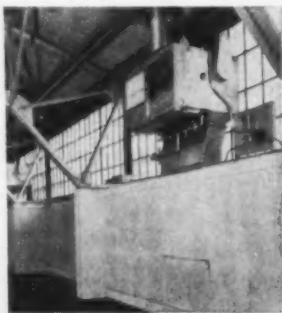
## HEATING PROBLEM:

How to dangle  
Navy Pier into  
icy Lake Michigan  
and still keep  
it warm.



This exhibit hall required enough heat for 480 average homes during large winter conventions! The same heating system had to quickly modulate for smaller exhibits and also provide summer ventilation. In 1936, Janitrol Gas-Fired Unit Heaters were specified and today 117 units are performing with minimum maintenance and complete satisfaction.

For heating that's engineered to your job, check Janitrol. For more information, write for "Businessman's Blue Book of Better Heating".



Twin Janitrol Unit Heaters, placed overhead along the outer walls of Navy Pier, heat and circulate 5,800 cubic ft. of air per minute!

Janitrol Heating  
& Air Conditioning Division  
Surface Combustion Corporation  
Columbus 16, Ohio  
In Canada: Alvar Simpson Ltd.  
Toronto 13

ALSO MAKERS OF **Surface** INDUSTRIAL FURNACES **Kathabar** HUMIDITY CONDITIONING

## TECHNICAL BRIEFS

the nation's most powerful jet engines and afterburners.

Ryan is devoting \$50,000 to the task of muffling the noise created by these seething power plants as they blast out tons of hot exhaust gases under full power tests. Direct beneficiaries of this investment in sound control will be Ryan employees, airport personnel and citizens of the surrounding community.

### Cuts Sound Intensity

The silencing equipment will cut sound wave intensities to half their initial strength in most of the objectionable frequency ranges. Due to psychological reasons, slight changes in sound wave intensities account for substantial variations in hearing sensation. Therefore, this 50 pct reduction will actually mean that the noise heard outside the jet test cell will be only one 1/100th the amount which an unmuffled engine would create.

Stated another way, it means that employees immediately outside the test cell will be able to converse in normal tones when a jet engine is running with no more interference than would be caused by an unprotected turbojet operating at a distance of four miles away.

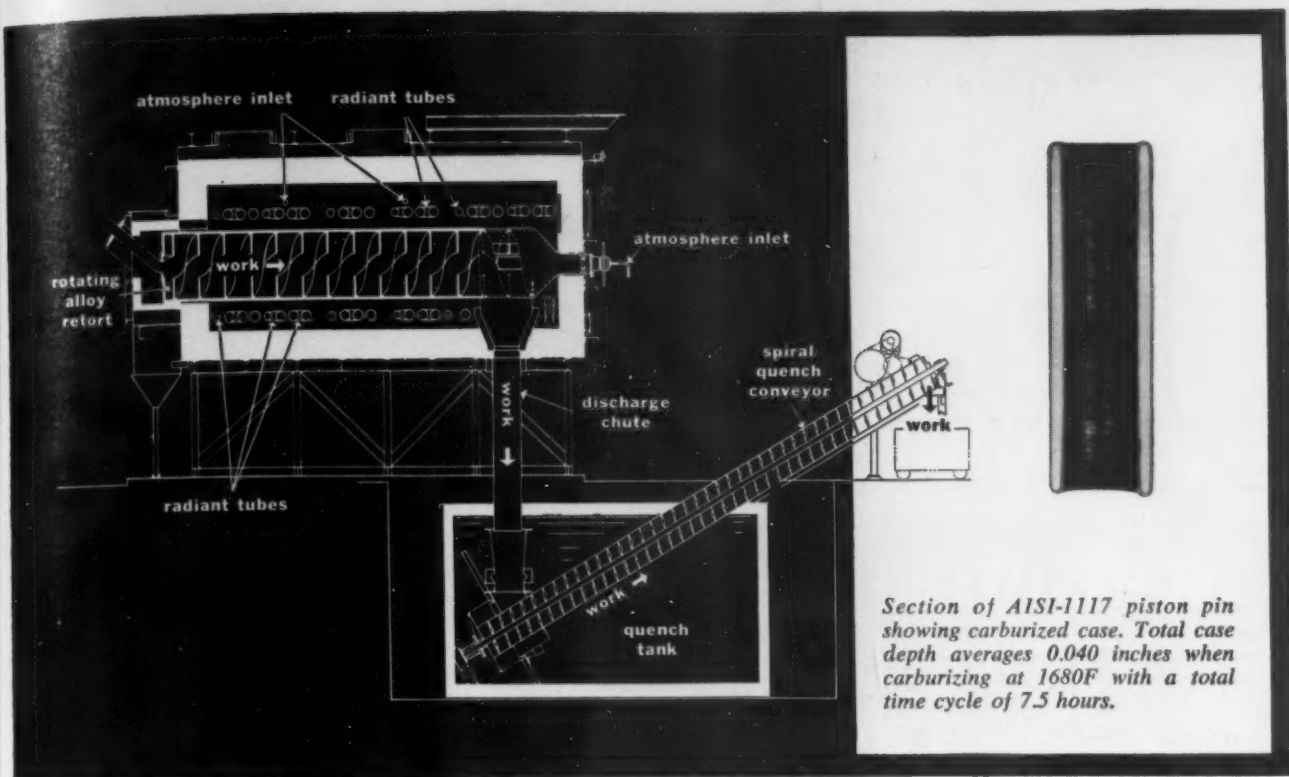
### Noise on Broad Range

In contrast to many industrial noises, jet engines produce intense noise levels over a broad range of frequencies. Actually, they are somewhat like fire sirens in that both are good noise producers and function by passing streams of air through whirling blades.



Sound is trapped . . .

THE IRON AGE



## Chrysler increases production, improves quality of piston pins

### WITH 'SURFACE' ADVANCED GAS CARBURIZING

When Chrysler Division metallurgists replaced pack carburizing of piston pins with gas carburizing they selected a 'Surface' rotary retort continuous gas carburizer and RX® gas generator. Four big dividends have justified that selection:

1. **Production increased** to 550 pieces per hour.
2. **Overall time reduced**—two heat treat operations eliminated.
3. **Work quality improved**—tumbling action of parts in the rotating retort exposes all surfaces to the carburizing atmosphere.
4. **Quenching improved**—the furnace delivers a steady flow of a few pieces at a time to the quench tank.

You can modernize your carburizing operations with 'Surface' equipment. Continuous furnaces are available in many types and sizes to meet your production requirements. Your 'Surface' engineer can help you select the equipment for your job.

Call him in today, or write for Literature Group H54-3.



**SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO**

ALSO MAKERS OF

**Kathabar** HUMIDITY CONDITIONING

**Jantrol** AUTOMATIC SPACE HEATING

November 18, 1954

183

## Air inlet silencers must keep turbulence and pressure loss down . . . Walls 2 ft thick . . .

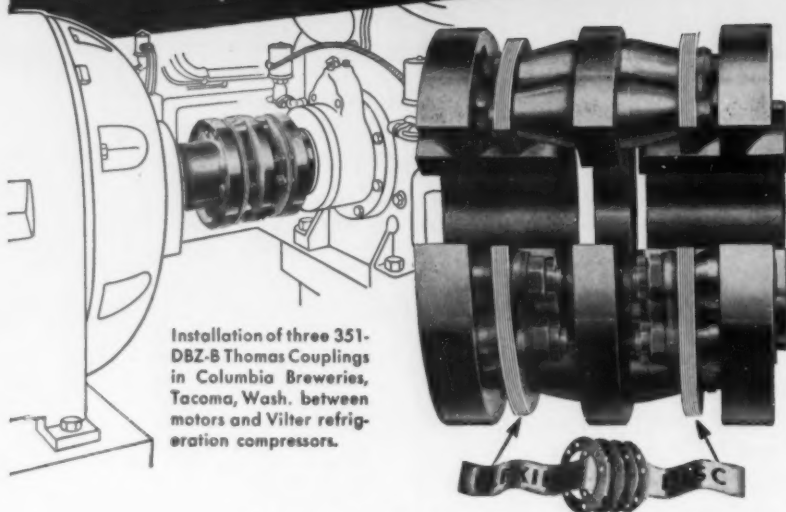
Aeronautical silencers for jet engine test must be designed with aerodynamic and thermodynamic problems in mind, as well as to meet the acoustical requirements specified. For example, air inlet silencers must provide for a minimum of turbulence and pressure loss. Exhaust silencers must handle fiery gases which have tempera-

tures that can soar as high as 3200°F.

### Big Concrete Vault

Designed by plant engineers, the Ryan test cell is a monolithic concrete vault with three major openings. These are two towering air inlet stacks and an exhaust chamber, fed by a 7-ft tube.

## THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

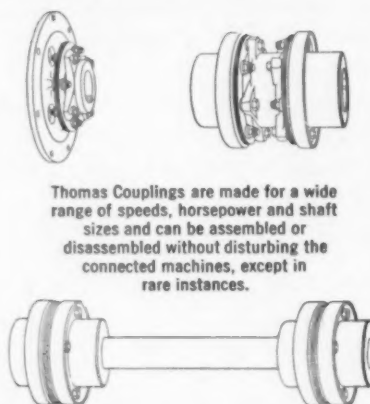
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Write for our new Engineering Catalog No. 51A

**THOMAS FLEXIBLE COUPLING COMPANY**  
Largest Exclusive Coupling Manufacturer in the World  
WARREN, PENNSYLVANIA, U.S.A.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Since the massive 2-ft thick walls of the cell conduct very little sound, the major sources of concern are the three openings. To muffle these avenues of noise, especially-designed silencing equipment has been fabricated by the Industrial Sound Control Corp. of Hartford, Conn.

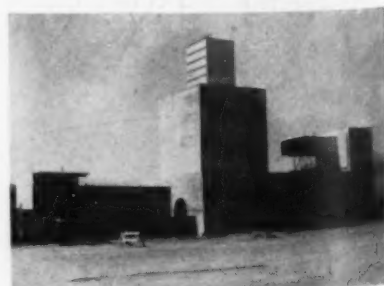
This equipment consists of assemblies of ICS's "Soundstream" units which are engineered to trap and absorb specific types of sound. Each unit is a perforated metal structure of sinusoidal configuration. They are filled with uniform layers of fibreglass material held in place with steel wire mesh. The units are installed in overlapping labyrinths designed to dissipate sound waves.

### The Nature of Noise

To get a good conception of the problems involved in silencing Ryan's jet test cell, it is necessary to understand the nature of noise. Noise is sound that disturbs, annoys or actually pains the ears of human beings. Sounds which are pleasing usually have a regularity of frequency and intensity for which the ear has been conditioned. The annoyance level of sound depends upon its frequency as well as intensity because the ear and nervous system are more sensitive to high pitched sounds than those of low frequency. Consequently, a silencing system, such as that installed at Ryan, must be efficient in attenuating sound intensities in all of the frequency ranges where objectionable sounds are transmitted.

### When Sound Is Not Sound

It's impossible to analyze sound without separating the subject into two parts; sound waves and the ear and brain which interpret them as sound. It has been said



A big concrete vault . . .



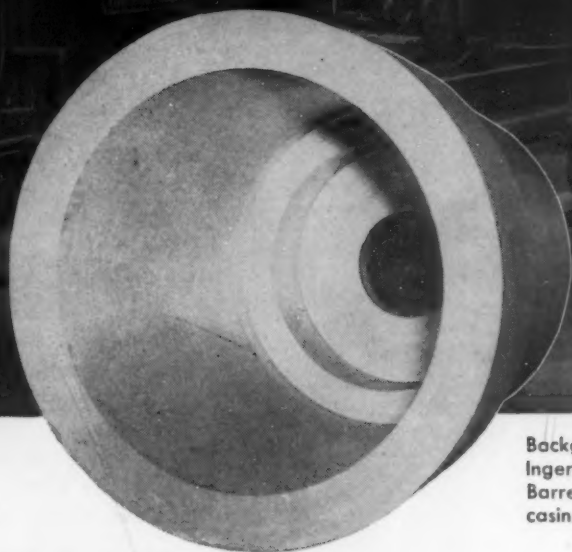
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AGE



Background photo shows a central station installation of two Ingersoll-Rand high pressure, multi-stage boiler feed pumps. Barrel forgings like this (inset) are used by I-R for the outer casings of all high pressure pumps.

## **Ingersoll-Rand tells how: STEEL FORGINGS HELP GIVE LONG LIFE TO HIGH PRESSURE BOILER FEED PUMPS**

Ingersoll-Rand Class CHTA boiler feed pumps are widely used in high pressure central power generating stations throughout the world. They are double-case units, the inner assembly containing the rotor and fluid passages and the outer casing providing the pressure vessel to enclose this pumping unit.

For service under high pressures and temperatures, Ingersoll-Rand uses steel forgings for the outer casing of these boiler feed pumps. Since Standard Steel forges these outer barrels from solid billets of

high carbon steel, they have a close grained, homogeneous structure. That's a big reason why Ingersoll-Rand double-case pumps have established a reputation for long, trouble-free service with sustained high efficiency.

Very likely, you can improve *your* products by using Standard Steel barrel forgings, rolled rings, flanges or other forgings. Our engineering and metallurgical departments have helped solve many diverse problems. Please write us about yours.




**Standard Steel Works Division**

**Burnham (Mifflin County), Pa.**

**BALDWIN-LIMA-HAMILTON**

General Offices: Philadelphia 42, Pa. Offices in Principal Cities

# famous for solving tough steel fabricating problems



In all parts of America, you'll find it pays to call on Levinson in Pittsburgh for special fabricating work that requires extreme care, good service and the engineering and mechanical ability reflected by more than 50 years of growing success. Send us an inquiry.

Fabricators, Designers, Erectors for over half a century

the  
**LEVINSON STEEL**  
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Phone HUBbard 1-3200

## TECHNICAL BRIEFS

that no sound would occur from an explosion in a desolate region if no living thing heard it. That's true, because sound is not sound until it is interpreted as such by the ear and brain. Before that, it is simply a silent movement of molecules of air, water or whatever the transmitting medium happens to be.

Sound is a nice example of the propagation of energy by longitudinal wave forms. In air, sound travels at the rate of 762 miles an hour or 1100 feet per second. When sound waves encounter a different medium, from that in which they are traveling, some of their energy is reflected, some is transmitted and the rest is absorbed in the form of heat.

### Converted to Mechanical Energy

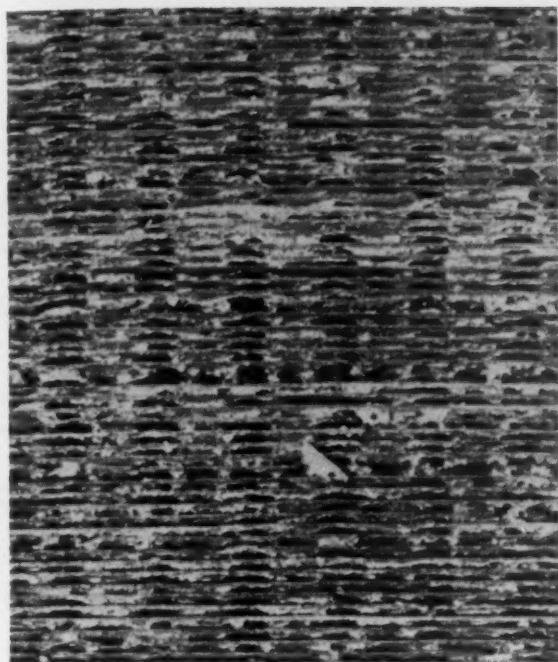
In this respect, sound waves act like light waves striking a glass panel where some of the light is reflected, some is transmitted and the balance is absorbed in the form of heat. When light strikes a completely black piece of velvet, all of the energy is absorbed. The objective of sound silencing systems is to absorb as much of the sound wave energy as possible.

When sound waves strike the ear, they set the ear drum in vibration and part of the sound energy is converted into mechanical energy. The human ear can distinguish the pitch (determined by sound wave frequencies), loudness (determined by wave intensity) and tone (determined by the wave shapes) of sounds. The ear is sensitive to an enormous range of sound running from 20 to 20,000 vibrations per second in frequency and from a whisper to a thunderclap in loudness.

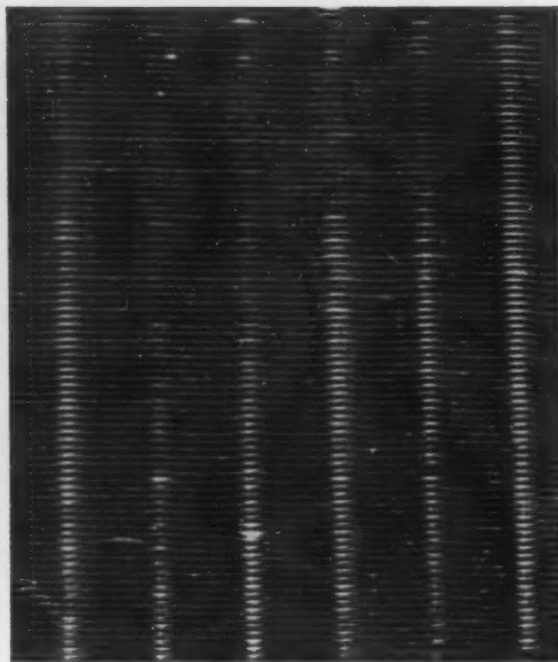
### Decibel Rates the Intensity

Engineers measure the intensity of sound waves with "decibel" ratings, which are a measure of the amount of energy which the sound waves are transmitting. However, decibels will not provide the total answer to the annoyance factor of sound because human beings interpret sound

# 1150-hour salt spray test shows increased corrosion resistance with Bonderite on aluminum



**UNTREATED.** Unretouched photo of section of aluminum refrigeration air conditioner condenser after 1150 hours in salt spray. Note corrosion.



**BONDERITE-TREATED.** Unretouched photo of identical aluminum refrigeration air conditioner condenser after 1150 hours in salt spray. Note absence of corrosion.

If you want more effective bare corrosion resistance or increased durability for paint, treat aluminum and its alloys with Bonderite.

Special formula Bonderites have been developed and tested and proven thoroughly for this purpose. They form a thin, iridescent, remarkably effective integral coating with the aluminum in simple and economical operation. Solutions are sludgeless, easily controlled, and produce results of uniform high quality.

The Bonderite coating is flexible, withstanding

moderate draws without trouble. The coating conducts electricity, necessitating no change in arc and spot welding procedures. Bimetallic and galvanic corrosion resistance is high.

Bonderite for aluminum is shipped in concentrated liquid form, easy and safe to handle and use.

Get complete information on this more effective protection for aluminum and its alloys. Write for bulletin on Bonderite 710 and 720.

*\*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

Since 1915—Leader in the Field



## PARKER RUST PROOF COMPANY

2186 E. Milwaukee, Detroit 11, Michigan

**BONDERITE**  
corrosion resistant  
paint base

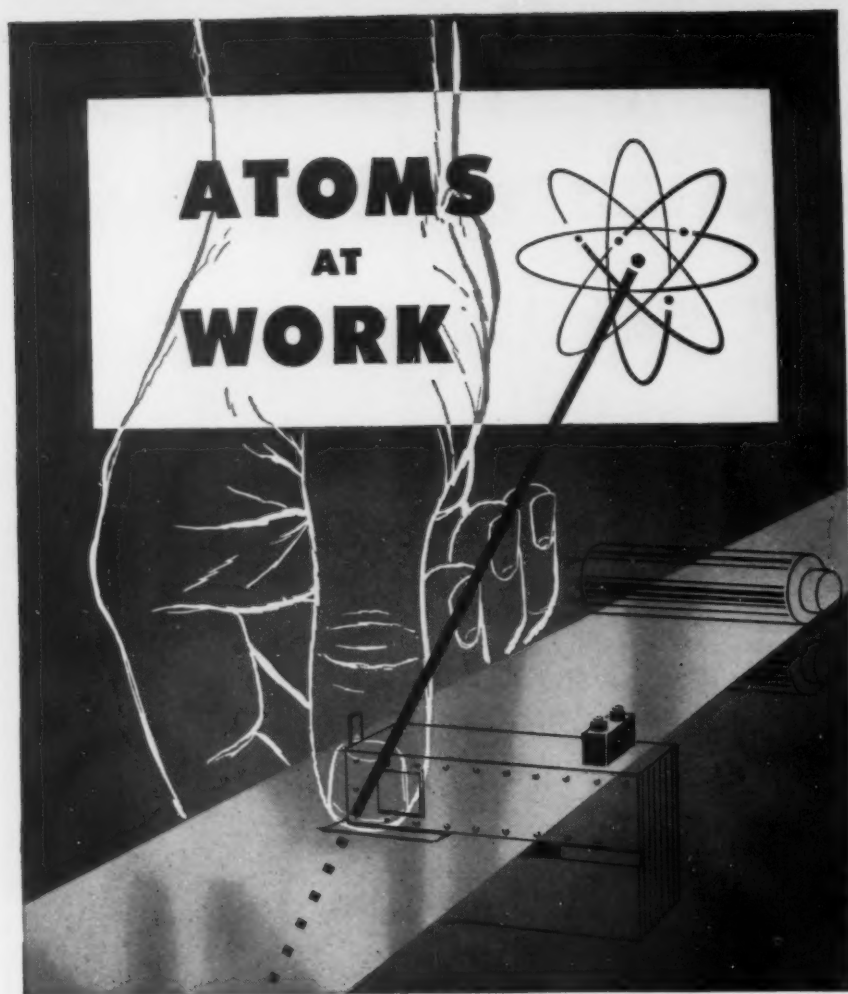
**BONDERITE and BONDERLUBE**  
aids in cold forming  
of metals

**PARCO COMPOUND**  
rust resistant

**PARCO LUBRITE**  
wear resistant for friction  
surfaces

**TROPICAL**  
heavy duty maintenance  
paints since 1883





## AT WALLINGFORD STEEL

At Wallingford, harnessed atoms precisely control steel thickness and assure important improvement in uniformity . . . *automatically*. Here, radioactive isotopes of strontium or ruthenium demonstrate their superiority over mere man. Electronic continuous gages check strip, ranging down to .002" and to tolerances as close as .0001", without touching the metal to mark or otherwise affect it. *Man alone is unable to control steel thickness so accurately . . . so fast!*

This practical application of atomic energy to improve our quality control is another reason why you can be confident that Wallingford will meet your most rigid specifications for stainless steel strip and tubing *exactly* . . . another reason for arranging to use Wallingford's ultra-modern facilities *soon*.



WALLINGFORD, CONN., U. S. A.

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP AND TUBING

### TECHNICAL BRIEFS

waves in different ways depending upon the frequencies encountered and their psychological responses.

In the new Ryan jet engine test cell, Industrial Sound Control engineers have reduced the sound intensity of an operating jet engine from 150 decibels to approximately one-half in most frequency ranges. At first glance, this might convey the impression that the noise heard outside the test cell would merely be cut in half. This is far from the case.

#### Drains Off 99 Pct

An employee working outside the structure will experience only one 1/100th of the noise sensation which he would suffer if he were the same distance from the engine and no silencing were provided. To accomplish this, the silencing equipment must drain off more than 99 pct of the acoustic energy. As a result, it will be possible for employees near the test cell to talk in normal tones.

### Drilling:

**Trunnion fixture eases  
radial drilling operation.**

A simple, home-made trunnion fixture for radial drills has cut setup time, eased holding problems, and improved the accuracy of jobbing work at the De Laval Steam Turbine Co., Trenton, N. J.

The fixture, made in the De Laval machine shop, consists of a bed mounted on two A-frames that may be clamped at any point along the bed. An index plate, shaft-connected to a worm-gear drive, is



**Plate clamps to bed . . .**

# 31,000-ton steel framework for 41-story Chicago skyscraper rises above busy railroad tracks



## AMERICAN BRIDGE safely handles difficult construction problem with minimum interruption in rail traffic

CONSTRUCTION of the new Mid-America Headquarters building of the Prudential Insurance Company, being built above 18 tracks of the Illinois Central Railroad located at Michigan Avenue and Randolph Street in Chicago, is now well under way. The big, 600-ft. skyscraper, which straddles eighteen railroad tracks, is moving upward according to schedule with little or no interruption of rail traffic.

Approximately 31,000 tons of steel will be used for the framework for this tall, modern structure—all of

which is being fabricated and erected by American Bridge. It will take 125 American Bridge men about one year to erect the big steel columns, beams and girders for the towering structure.

When completed next year, the Prudential Building will rank among the world's most outstanding office buildings. And it will take its place alongside the Empire State Building, the Chrysler Building, the United Nations Headquarters, and other notable American Bridge structures from coast to coast.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION  
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND  
DALLAS • DENVER • DETROIT • ELMIRA • GARY • MEMPHIS • MINNEAPOLIS • NEW YORK • PHILADELPHIA • PITTSBURGH  
PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON • UNITED STATES STEEL EXPORT COMPANY, NEW YORK



## PRUDENTIAL LIFE INSURANCE COMPANY BUILDING Chicago, Illinois

Architect and Engineer:  
Naess and Murphy, Chicago

General Contractor:  
George A. Fuller Co., Chicago

Steel Fabricators:  
American Bridge

Steel Erectors:  
American Bridge

USS

# AMERICAN BRIDGE

UNITED STATES STEEL



## Townsend made this automotive part at a savings of \$18,000 per year

Big savings turn up in unexpected places when you examine the cost of producing small parts and fasteners. That's what happened when a Townsend engineer suggested that this small spacer stud could be produced by the Townsend method of cold-forming at one-third the cost of the former method. Result—a cool \$18,000 clipped from production costs and a tougher, stronger part.

This is possible because the Townsend method is fast. And all the raw material went into the part, none was cut away as scrap. As a result, more pieces per pound of metal were produced, resulting in additional economy.

Townsend parts have high resistance to shock and fatigue because cold-forming increases ten-

sile strength. The flow lines of the metal follow the contours of the piece instead of remaining in a single plane, as with machined parts. Cold-forming strengthens the threads and eliminates stock notching. Close size tolerances and excellent surface finish are characteristic of Townsend parts.

As "The Fastening Authority," Townsend produces 60-million pieces daily—regularly makes more than 10,000 special and standard fasteners and parts. With this capacity and the experience of 138 years of metal working to draw upon, Townsend engineers will help you reduce your material and assembly costs. Ask to have one of them call. For more information use the coupon below or write for illustrated bulletin.

# Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

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#### TOWNSEND COMPANY

Sales Department  
New Brighton, Pa.

Please send without obligation  
an "Special Cold-Formed  
Fasteners and Small Parts"  
bulletin TL-89.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

mounted on one A-frame. Index holes at desired intervals are jig bored and bushed. A spring-actuated index pin locks the index plate. A side-plate attached to the index plate and a matching side-plate on the tailstock A-frame are adjustable for height.

Jig plates can be made in standard sizes to fit these trunnion fixtures. Work may be drilled in various planes with a single clamping, and with the addition of an index plate to the jig plate, any compound angle can be obtained.

## Handling:

**Hopper, scoop, lift truck  
move foundry sand faster.**

The time-consuming task of unloading white sand from rail cars is now accomplished faster and more safely by the Electric Steel Foundry Co., Portland, Oregon. The company has fabricated two special hoppers which are loaded by a maneuverable Hyster "20" lift truck with scoop attachment working inside the car. The 4-ton hoppers are self-dumping and portable and replace hand-dumped buckets.

Previously it took four men 3 hours to unload a car of sand using the old buckets. Now four men are used for about one-half hour, or until the doorway of the car is clear of sand.

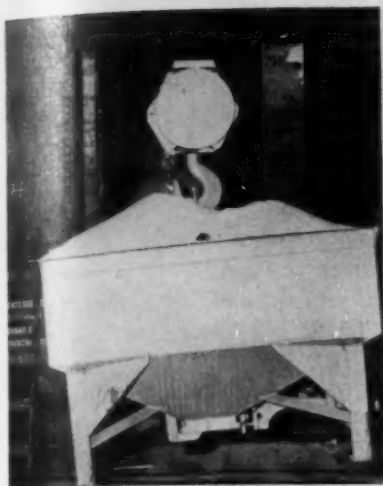
From then on it requires only two men to finish unloading the car



Loading the hopper . . .



## TECHNICAL BRIEFS



### Moving the sand . . .

in one more hour. This is accomplished by placing one hopper on each side of the car; while one is moved to the storage bin, the other is loaded with a special scoop lift attachment on the Lift Truck.

The new hoppers hold four times more sand than the old hopper. This means only 12 crane trips instead of 48, releasing the crane for other important work.

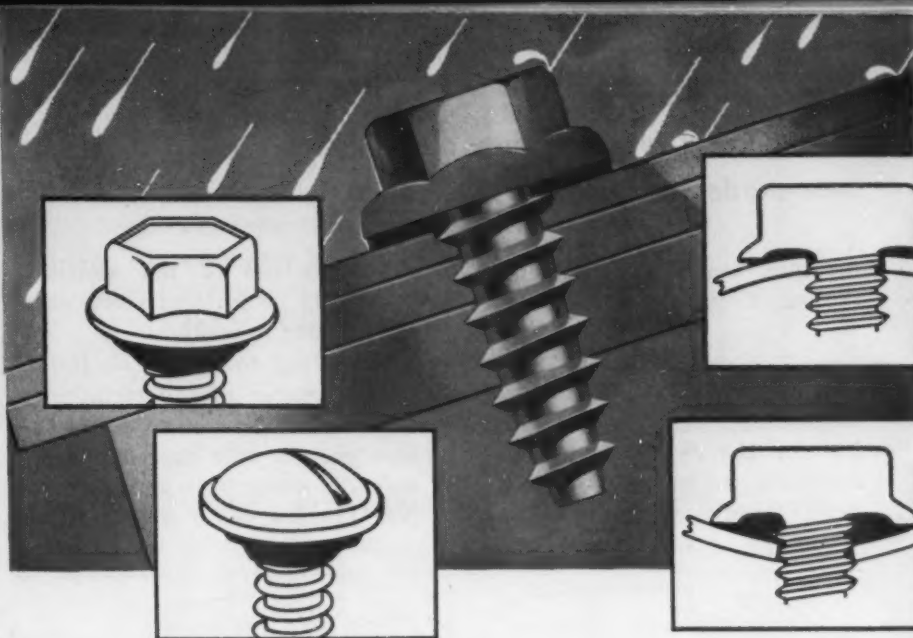
The boxes are self-dumping—a real safety feature. Using the old bucket, a man had to remain on the top of the sand bins and hand-dump the hopper. Now the crane operator lowers the hopper into the bin and a cleverly designed lever mechanism is tripped, opening a door on the bottom of the hopper which allows the sand to flow into the bin.

## Arc Melting:

**New laboratory set up, and new furnace designed by GE.**

Progress in the search for novel methods of producing new alloys, particularly those intended for use at high temperatures, is noted in the design and building of a multi-purpose, inert-atmosphere, arc-melting furnace by scientists of the metallurgy department, General Electric Research Laboratory.

The new furnace can handle ordinary metals such as copper and iron, or materials previously considered too refractory for commercial production — chromium,



## New *Tuff-Tite*\* Fastener Prevents Leaks— Protects Surface—Absorbs Shock—Stops Squeaks

Tuff-Tite is a new multi-purpose fastener with a one-piece metal head and assembled neoprene washer that gives you quick, secure, economical, leakproof fastening of metals and plastics.

Use of Townsend's Tuff-Tite makes possible watertight fastening of galvanized steel, protected metal, stainless steel, aluminum, plastic and other roofing and siding materials at substantial savings over conventional fasteners.

Leaks between the head of the screw and the metal washer are impossible because they are made as one piece. When this fastener is tightened, the pre-assembled neoprene washer is trapped and controlled by an undercut in the washer head. The neoprene is forced into the hole and around the threads to form a watertight and airtight seal.

Tuff-Tite fasteners provide surface protection in assembly of appliances and similar products.

The neoprene washer provides a cushion that permits tight seating without cracking or chipping porcelain enamel and other fine finishes.

Where vibration noise is a problem in automobiles, railroad passenger cars and machinery, the cast neoprene washer on Tuff-Tite fasteners acts as a shock absorber—eliminates squeaks and chatter.

Tuff-Tite fasteners are available as self-tapping screws, thread cutting screws, drive screws, machine screws, stove bolts, wood screws, nails and special products. They are made of carbon, alloy and stainless steel, aluminum, copper and other metals in a variety of head styles.

To learn more about how Tuff-Tite can increase your fastening efficiency—improve your products, use the coupon below or write.

THE FASTENING AUTHORITY

# Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

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**TOWNSEND COMPANY**  
Sales Department  
New Brighton, Pa.

Please send to me without  
obligation "Tuff-Tite"  
Bulletin TL-97.

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## Arc melting furnaces may offer highest man-made temperatures . . .

niobium, tantalum, tungsten, titanium, zirconium.

### A Research Center

Meanwhile, equipping of the Laboratory's new metallurgy building for the development of new materials and processes is making rapid progress. Arc-melting re-

search is one of the activities which will be centered there when the building is ready.

According to Dr. J. H. Hollo-  
mon, manager of the metallurgy  
department, "if we have reason-  
able success with present experi-  
ments in arc-melting molybdenum,  
this process could develop into

the most important method for  
handling materials essential to  
jet engines, guided missiles and  
gas turbines — wherever solids  
work at high temperatures."

### New High Temperatures Available

No one knows how high the  
temperature can be made to rise  
between the electrodes of an elec-  
tric arc. It can be higher than  
20,000°F, hot enough to boil any  
material now known to man, in-  
cluding the electrodes themselves.  
Thus the arc-melting furnace of-  
fers the temperature that is  
needed and a potential avenue to  
turning out much-needed, heat-  
resistant, high-purity materials in  
the absence of contaminating  
mediums.

Metallurgists would like to be  
able to handle these things as  
they handle ordinary metals.  
However, at the very high tem-  
peratures required to melt them,  
unwanted impurities are auto-  
matically introduced.

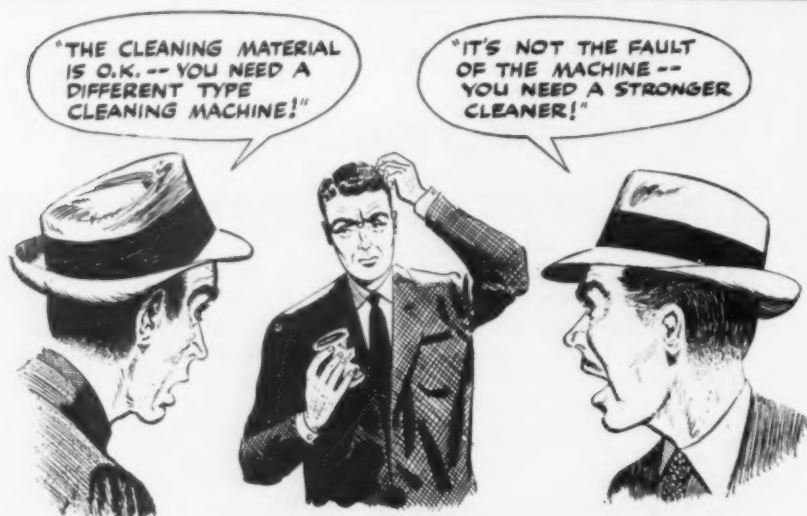
### Building Two Units

Two units of the new GE fur-  
nace are now under construction  
by engineers of the Industrial  
Heating Department. The original  
model was used, for example, to  
melt tungsten, molybdenum, ti-  
tanium, copper, and aluminum in  
atmospheres of argon, helium, or  
a combination of both these gases.

### Non-Consumable Electrode

The GE arc furnace makes use  
of direct current and a non-con-  
sumable electrode. Work is now  
going forward, however, on the  
design and construction of a new,  
quarter - of - a - million - dollar  
consumable electrode furnace ca-  
pable of operation to 1/100,000-  
000th of an atmosphere, achieving  
temperatures up to 12,000°F.

Current experimentation in the  
metallurgy department's mate-  
rials and processes section seeks  
to learn the chemistry of reac-  
tions in an arc furnace and how  
to melt new materials and alloys.  
Successful avenues of research  
are hoped for through vacuum  
technology, kinetics of deoxida-  
tion, automation and continuous  
casting.



## Have YOU Ever Been Caught In The Middle?

Doesn't it make good sense to avoid the above situation by putting your cleaning problems *completely* in the hands of one organization capable of providing you with tailored-to-fit cleaning methods?

That's what you get at Magnus. We specialize in *Methods* cleaning — not just in the manufacture of cleaning machines or just in com-  
pounding cleaning materials. The answer you get from us will be a  
packaged cleaning process engineered for your particular production  
problem.

Because Magnus makes over 200 different cleaning compounds  
AND builds all types of cleaning equipment, our recommendations  
are unbiased and made with the one thought of solving your cleaning  
problem with the *right* method.

**BUT...**

*we can't help you until you tell us your problem.  
Why not outline your problem in a letter today.*



**MAGNUS CHEMICAL CO., INC.**

46 South Avenue, Garwood, N. J.

In Canada — Magnus Chemicals, Ltd., Montreal

Service Representatives in Principal Cities

**For a trouble-proof finish — start at the bottom**

## NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 173 or 174



### Hobber with universal gear production feature

The new Model 1445 Ultra-Speed hobber is designed from the base up for high-speed hobbing. The single-spindle machine will machine both spur and helical gears at selective variable speeds ranging to 570 rpm. It will handle up to 8 pitch gears having diameters as large as 5 in. and face widths to 4 in. Either climb or conventional hobbing can be utilized. Highlighting the universality of the 1445 hobber is the hobbing spindle head which incor-

porates three separate adjustments: hob thread angle, gear helix angle, and hob position shift. Hob angles of  $\pm 15^\circ$ , and left or right helix angles up to  $45^\circ$  can be set up within a matter of seconds. Adjustments are accomplished by swivel-mounted sections with vernier scales for supplying accurate settings. Hob position is shifted hydraulically over a total movement of 3 in. *Michigan Tool Co.*

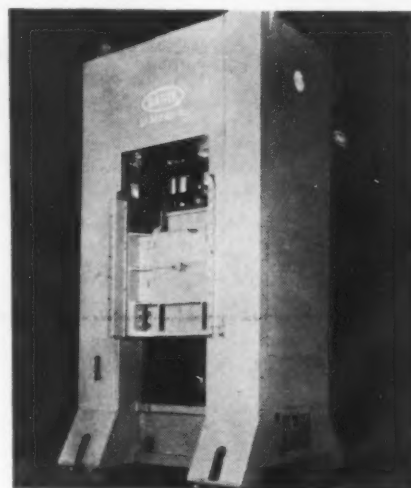
For more data circle No. 34 on postcard, p. 173.

### Presses have double action right to left drive

Clean, uncluttered design and greater compactness are made possible by the unusual one-point, double action, right-to-left drive used in a new series of presses being made for the automotive industry. This press has a 26-in. stroke and 60-in. shut height on the inner slide, with overall height only 21 ft. Extreme compactness has been achieved by placing the drive on the back of the crown and bringing blankholder linkage down into the uprights. Special shallow

bed construction, without sacrifice of rigidity, reduces the height and eliminates the need for an installation pit. Adjustments for the blankholder have likewise been kept inside the body of the press to maintain the clean line. The press is equipped with an eddy current clutch providing electrical acceleration of the slide motion for faster stroking rates without exceeding safe drawing speeds. *Danly Machine Specialties, Inc.*

For more data circle No. 35 on postcard, p. 173.



### Packaged gas-air mixing and carbureting machine

The Waukee Mixer is supplied as a complete package with vane type compressor, standard 1750 rpm motor drive through V belt, motor adjusting base, air filter, pressure relief valve, gas zero governor, lubricator, carburetor and flowmeters all mounted and factory piped. Package design simplifies installation and saves time and money in piping. Carburetor can be completely disassembled, cleaned and put back together in 5 min

using ordinary screw driver and without disturbing the ratio setting. With its precise control of air ratios, this unit may be used on gas generators of the endothermic and exothermic types. It is also useful for producing gas-air mixtures for flame hardening, torch brazing, torch annealing and soft metal melting. Made in 3 sizes. *Waukee Engineering Co., Inc.*

For more data circle No. 36 on postcard, p. 173.

Turn Page

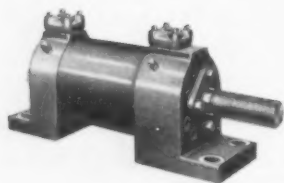


# More *modern* Industries

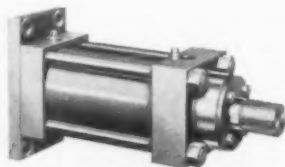
than ever before  
are now specifying

## ACIPCO STEEL *Centrifugally Spun* TUBES for . . .

- ALL TYPES OF ROLLS
- HYDRAULIC CYLINDERS
- FURNACE TUBES
- CHEMICAL RETORTS
- MANY OTHER INDUSTRIAL APPLICATIONS



ACIPCO STEEL centrifugally spun tubes were employed in the construction of the 3000 psi (above) and 2000 psi (below) hydraulic cylinders.



### Distributors:

Austin-Hastings Company, Inc.  
226 Binney Street  
Cambridge 42, Massachusetts

Peter A. Frasse and Co., Inc.  
17 Grand Street  
New York 13, New York

Strom, Carlisle and Hammond Co.  
1392 West Third Street  
Cleveland 13, Ohio

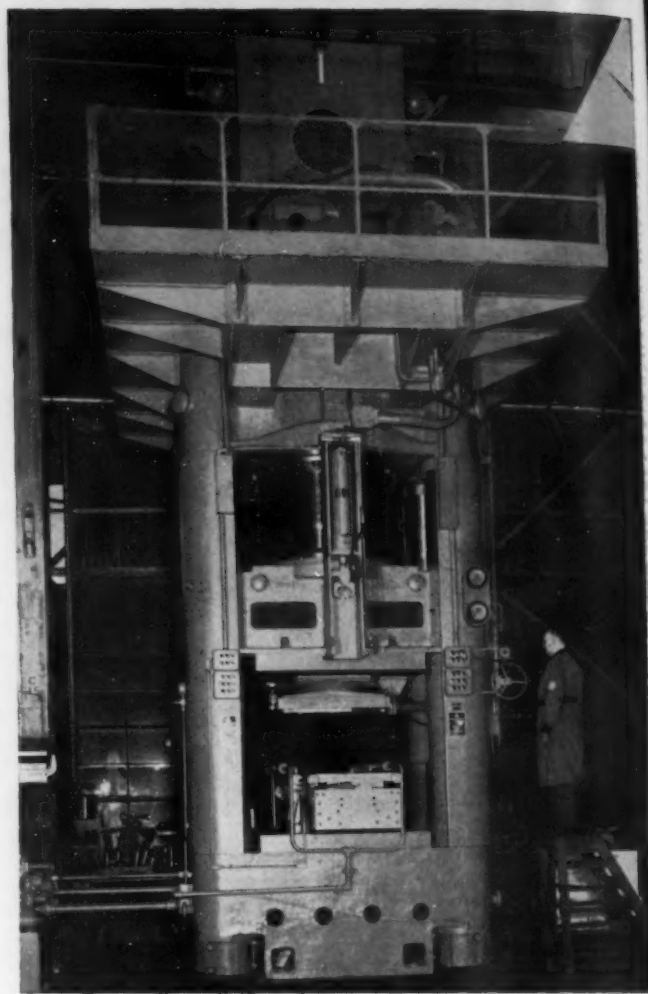
Lyman Tube and Bearings, Ltd.  
920 Ste. Sophie Lane  
Montreal 3, Canada

J. M. Tull Metal and Supply Co.  
285 Marietta Street, N. W.  
Atlanta, Georgia

Ducommun Metals and Supply Co.  
4890 South Alameda Street  
Los Angeles 54, California

C. A. Roberts Company  
2401 25th Avenue  
Franklin Park, Illinois

T. E. Rybka  
South Park Road—R. D. 4  
Liberty, Pennsylvania



NEEDLESS TO SAY, the hydraulic press shown above and others like it must be built to withstand a lot of rugged punishment. Many of these industrial giants employ various types of hydraulic cylinders constructed of ACIPCO STEEL centrifugally spun tubes for shuttle feed use and the like.

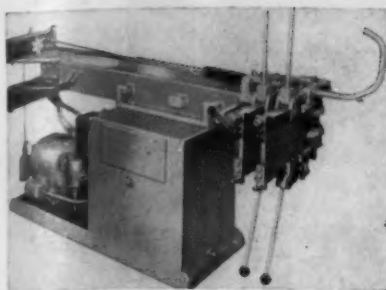
ACIPCO STEEL tubes are serving in countless industrial uses and their exceptional value as a component in weldment applications is widely recognized. Tubes can be furnished in all the alloy grades including heat and corrosion resistant stainless steels as well as plain carbon grades. Special non-standard analyses are also available. ACIPCO tubes are manufactured in lengths up to 16 feet with wall thicknesses from .25" to 4". Outside diameters range from 2.25" to 50" and in large sizes ACIPCO tubes have a decided economical advantage over hollow-bored forgings.

In ACIPCO tubes there is an absence of directional lines of weakness found in hot rolled or cold drawn tubing. Tubes can be furnished rough as-cast, finished machined or honed to your specific need.

### AMERICAN CAST IRON PIPE COMPANY

**Special Products Division**  
**Birmingham 2, Alabama**

NOW AVAILABLE without charge. "ACIPCO STEEL Centrifugally Spun Tubes"—a new 16mm sound motion picture in color (33½ minutes) showing ACIPCO's centrifugal tube-making process. Write ACIPCO, P. O. Box 2603, Birmingham 2, Alabama.



### Tube bender permits right and left hand operation

Design of a horizontal semi-automatic tube bending machine permits clockwise and counter-clockwise operations. An extended main spindle and double ways are mounted on the top and bottom of both the stationary and swinging arms. The unitized head and top as-

sembly is double-hinged to the base which permits turning over the entire assembly 180°. This feature permits handling bending operations in either direction and interchanging tooling quickly and easily. *Pines Engineering Co., Inc.*

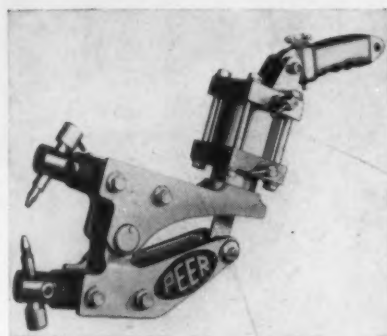
For more data circle No. 37 on postcard, p. 173.

### Speed variator provides nine to one speed range

Infinite speed variation for driving machine tools and other production equipment is provided by the new line of variable speed drives. Power is transmitted from the input shaft to the output shaft through alloy steel driving balls which are in pressure contact with disks attached to the two shafts. Rolling action of the balls permits smooth adjust-

ment of output speed from 1/3 to 3 times the input speed while operating under load. The speed variator is available in 9 sizes, ranging from 1/2 to 10 hp at 1750 input rpm. Operating efficiencies of 75 to 90 pct are said to be easily maintained over a wide range of operating conditions. *Cleveland Worm & Gear Co.*

For more data circle No. 38 on postcard, p. 173.



### Portable gun welders speed production on large sheets

A new line of lightweight, heavy-duty portable gun welders make it possible to take the machine to the job, and speed production on large sheet metal and wire assemblies. Gun welder units are available in 30 to 100 kva capacities for air or air-hydraulic operation on 220, 440 or 550 v power supplies. Due to the small number of parts, maintenance

of the gun welders is simple. Six basic gun types (scissor type) are available for special applications. Operating equipment includes water-cooled flexible cables, overhead suspended transformer with balancing arm, timing and contactor controls. Extra long or retractable stroke is optional. *Peer Inc.*

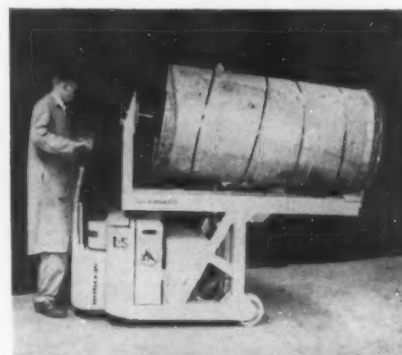
For more data circle No. 39 on postcard, p. 173.

### One man-one truck solve rubber company problem

Unloading 2000-lb vertical rolls of fabric from freight cars, transporting them to storage and rotating them to 90° horizontal position for pick up by an overhead crane can be done with a special Jacklift electric truck. A hydraulically-rotated roll cradle attachment allows one man and one truck to do the entire operation. A special arm automatically engages the shaft of the roll

when rolls are in vertical position. Moving the truck closer to the roll tilts the roll so that the toe plate of the cradle slides under it without damage. The roll can then be hydraulically rotated 90° to a horizontal position. All controls, including the rotating action, are in the handle head of the truck. *Lewis-Shepard Products, Inc.*

For more data circle No. 40 on postcard, p. 173.



### Throw-away tool line offers improved machining

New low-cost type of tungsten carbide tooling, added to the Kendex line, utilizes throw-away carbide inserts which may be turned over and used on each side prior to disposal. It eliminates all grinding in the user's shop, cuts cost per cutting edge, provides a new system of chip control, and may be indexed in

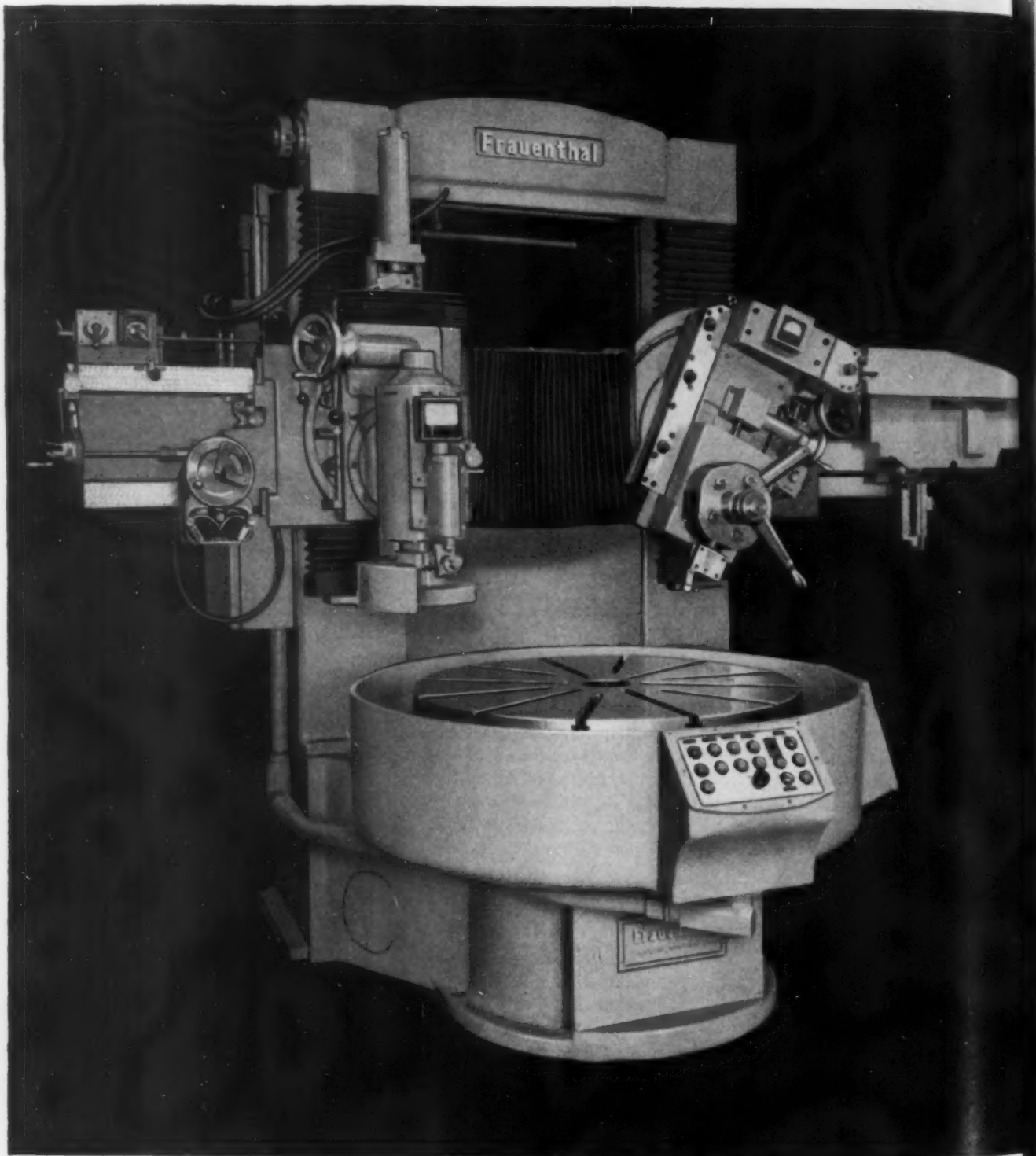
seconds. Kendex button tools and heavy duty Kendex tools comprise the new tooling. On the button tools a removable chip-breaker is used, while on the heavy duty line a hardened clamp serves as a chip deflector. *Kennametal Inc.*

For more data circle No. 41 on postcard, p. 173.

Turn to Page 200

# CAN YOU

to. 000200" accuracy





# turn, bore and grind in a single set-up?

**The Frauenthal 3100 Series offers this precision and versatility with these cost-cutting features**

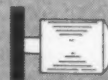
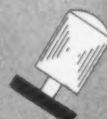
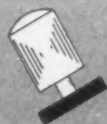
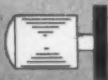
- 1. Utmost versatility** — Both grinding compound and turret slide can be swiveled to meet practically any angular requirement.
- 2. Super-precision performance** — Only a Frauenthal grinds related surfaces to accuracies within .000200", producing consistently uniform precision in concentricity, parallelism and roundness.
- 3. Horizontal table** — Loads easier and faster than vertical face plates. Horizontal table also provides greater stability for large, heavy parts.
- 4. Simplified tooling** — Horizontal table permits simpler fixtures, particularly for thin-section jet engine parts, plus economy of dual purpose tooling for turning and grinding.
- 5. Convenient controls** — All operating controls are easily within the operator's reach for quick selection of feeds and speeds. Electrical interlocks are provided for utmost safety.
- 6. Contour turning** — Hydraulic duplicator attachment (turning head) performs tracer controlled turning operations most accurately and performs repetitive operations at lower cost.

**May we help you?**

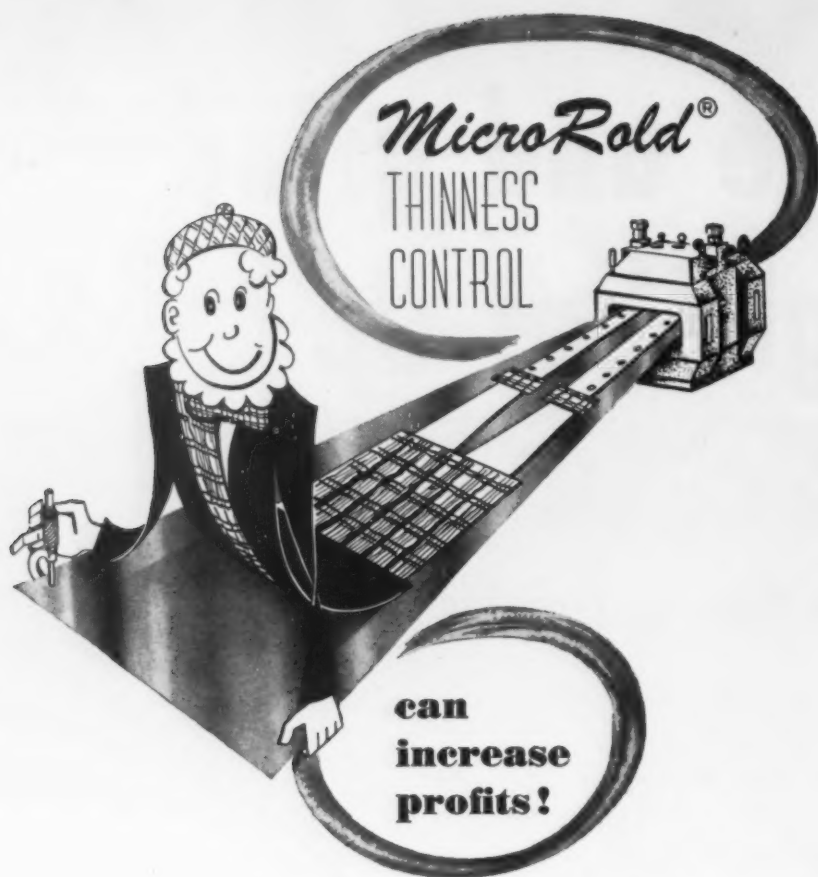
If you'd like further information on how the 3100 Series precision turning and grinding machine can give you production and/or tool room advantages — our engineers are at your service. Write for informative bulletin No. 301.



Your choice  
of five positions  
of the grinding spindle



**Frauenthal Division • KAYDON ENGINEERING CORP. • Muskegon, Michigan**



"Thinness Control" means that the decimal thickness of each sheet is uniform throughout the length and width.

Job costs are figured on a square foot basis while stainless steel is purchased on a weight basis. When stainless steel is ordered by gauge number the permissible A.I.S.I. thickness variation is plus or minus 10%. If you receive material on the heavy side of the gauge range you are paying a premium for stainless surface area. For example, if you order 18 gauge, you may receive sheets .052" thick, when a thickness of .0475" would suit your purpose. On a standard 18 gauge sheet (36"x120") each .001" in thickness weighs 1.26 pounds per sheet. In this example, each stainless sheet could weigh as much as 5.67 pounds more than required. You can readily see the advantages of specifying stainless rolled to the light side of the gauge range. MicroRold stainless is rolled to exceptionally close tolerances, as low as 3% average (plus or minus). Regular use of MicroRold provides more stainless area per ton or the equivalent area with lesser weight.

If you are not now a user of MicroRold sheet it will pay you to get the full details. Your steel distributor will gladly tell you the MicroRold story.

**Washington Steel**

*Corporation*

WASHINGTON

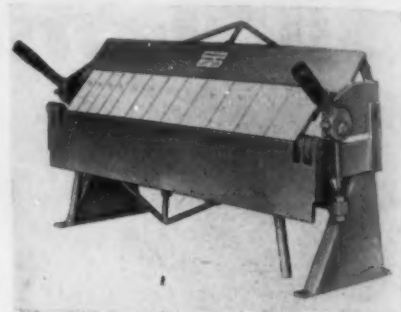
PENNSYLVANIA



## NEW EQUIPMENT

### Universal bench brake

A new brake is particularly fitted to accurate short run production and experimental work as well as plain or box and pan jobs. Rated capacity of the Model U322 is a



$\frac{3}{8}$  in. flange on 22 gage mild steel, full 3 ft length. Fingers of case hardened steel in widths of 2, 3 and 4 in. allow box depths to 3 in. Design features include replaceable bronze bushings, easy adjustments and simple operation. The machine is portable for on the job setup. *W. Whitney Stueck, Inc.*

For more data circle No. 42 on postcard, p. 173.

### Plastic jet siphons

Illustrated are two sizes of Camac acid proof plastic jet siphons for emptying waste acid from tanks and sumps. Plastic is fiberglass-reinforced Furacam which is not at-



tacked by acid or alkaline solutions except strong chromic or nitric acid. Nozzles are sized for standard acid hose. The unit is easily disassembled for cleaning. *Carl Buck & Associates.*

For more data circle No. 43 on postcard, p. 173.

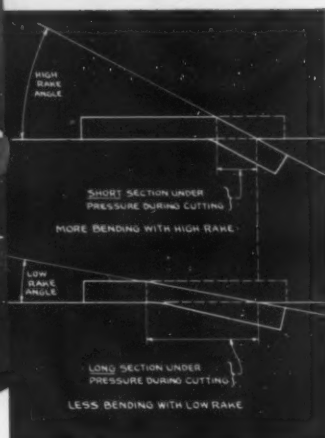
**Turn Page**

# LOW RAKE means . . .



Built in all sizes for cutting thicknesses of 12 gauge to 1 1/4 inch and lengths up to 18 feet.

# LESS



## TWIST

Excessive bending during cutting is the major cause of twist in pieces sheared. There is a direct relation between bending and the rake or shear angle of the upper knife. A high rake bends a piece MORE than a low rake because a SHORTER section of the stock is under pressure during cutting.

## CAMBER

Departure of the edges of a strip from a straight line is called camber. An important factor in causing camber is high rake which tends to rotate a sheet during cutting.

## BOW

Bow is deformation in a direction perpendicular to the surface of a strip. Here again experience shows that low rake gives the best results.



## WHEN CUTTING WITH STEELWELD SHEARS

MORE is required of a shear than the power to cut, to achieve precision shearing. A great deal depends on how the cut is made if parts cut are going to fit accurately without additional work.

For this reason rake, or knife shear angle has been made very low on all Steelweld Shears. This of course requires more driving power and consequently a larger driving motor and heavier construction

throughout than would be necessary with a higher rake. But it minimizes twist, camber and bow in pieces cut.

Because of low rake and also because of the ease with which knife clearance is adjusted to suit every plate thickness, cuts made on Steelweld shears are unusually smooth, straight and true.



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CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

### THE CLEVELAND CRANE & ENGINEERING CO.

4804 EAST 282ND STREET, WICKLIFFE, OHIO

# STEELWELD PIVOTED BLADE SHEARS



# Tempilstik°

FOR ALL  
HEAT-DEPENDENT  
OPERATIONS

*looks like a  
crayon...  
marks like a  
crayon...  
tells temperatures  
like a precision  
instrument!*

Sixty-three different compositions enable you to determine and control working temperatures from 113° to 2000° F. TEMPILSTIK° marks on workpiece "say when" by melting at stated temperatures—plus or minus 1%.

ALSO AVAILABLE  
IN LIQUID AND PELLET FORM  
...WRITE "CUSTOMER SERVICE"  
FOR SAMPLE TEMPIL° PEL-  
LETS...STATE TEMPERATURES  
OF INTEREST—PLEASE!

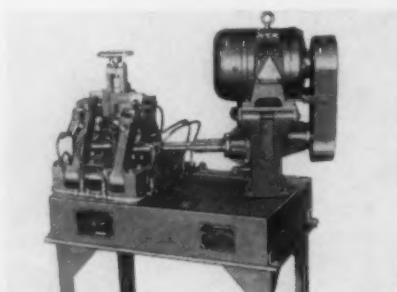
**Tempil°**  
CORPORATION

132 WEST 22ND STREET  
NEW YORK 11, N. Y.

## NEW EQUIPMENT

### Straightens short rods

Small table-mounted straightener is designed specifically for precision straightening of rods and tubes of small diameter and short length. A 7-roll straightening principle is employed in the pass line.



Roll arrangement provides ease of feeding, positive retention of tubing to pass line and accurate end-to-end straightness at continuous production speeds without use of guides of any kind. Setup time is fast and easy with only three adjustments required. *Sutton Engineering Co.*

For more data circle No. 44 on postcard, p. 173.

### Coil stock grab

New design in coil stock grabs for lifting coils weighing up to 1000 lb is useful in areas where the overhead space is limited. Model H lifts



the coil from the inside diameter and is primarily for moving coil stock from the pallet position to the coil stock reel. It handles coils from 1/2 to 6 in. wide and has a radial capacity up to 13 in. *Dixon Automatic Tool, Inc.*

For more data circle No. 45 on postcard, p. 173.

# High purity gas

at  
low  
cost!



produced by

**DEOXO purifiers**

Reactions Complete!  
Leaves gas PURE...

less than one part per  
million impurity remains.

- ✓ No Maintenance Cost
- ✓ No Operating Cost
- ✓ No Reactivation

**CATALYTIC OPERATION**  
at HIGH or LOW PRESSURE

... At Room Temperature:

Removal of oxygen  
(up to 3%) and/or  
hydrogen (up to 6%)

... At 125° Centigrade:

Conversion of CO to CO<sub>2</sub>

... At 250° Centigrade:

Methanation of CO to CH<sub>4</sub>

Available Capacities:  
25 CFH to 500,000 CFH  
and larger. Special Units  
Designed for Specific  
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& COMPANY, INC.

**PRECIOUS  
METALS**

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NEW YORK • SAN FRANCISCO  
CHICAGO • LOS ANGELES

## NEW EQUIPMENT

### Pre-masked nameplates

Pre-masked Metal-Cals are suitable for application to unpainted surfaces. The thin anodized, etched aluminum nameplates are completely masked to allow painting of an article after the trademark or label

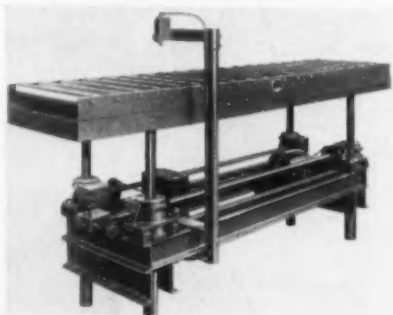


is applied, building up the paint around the edge and making it an integral part of the item to which it is affixed. The masking is easily stripped off. Metal-Cals are available in a wide range of colors, and may be applied to any smooth, curved or flat surface. *C & H Supply Co.*

For more data circle No. 46 on postcard, p. 173.

### Handles long sheets

Designed for use in a steel mill to facilitate the handling of long sheets being fed into a shear, a new Portelvator has a roller conveyor top which measures 28x120 in. and has a lift of 19 in. One man



is able to handle the long sheets with little or no effort. Pushbutton start and stop control and a gear driven limit switch give the operator ease of control and operation. Minimum height is 27 in., maximum height 46 in. A rocker arm automatically maintains constant level of the table as the stack of sheets diminishes. Load capacity is 10,000 lb. *Hamilton Tool Co.*

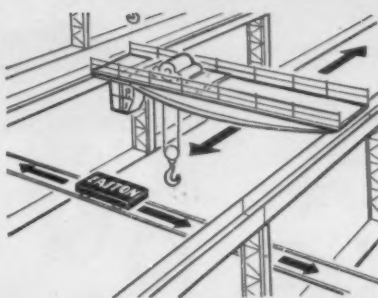
For more data circle No. 47 on postcard, p. 173.

Turn Page

November 18, 1954

# Cross-Bay Transfer

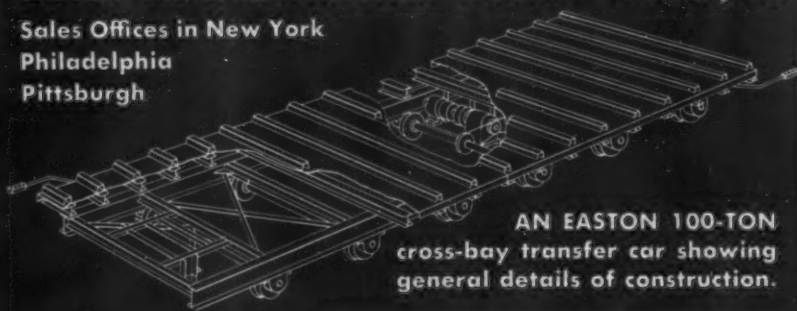
TRADE MARK



The EASTON motorized cross-bay transfer car is designed to provide lateral handling of materials to supplement overhead crane service in modern multiple bay plants. The cross-bay movement of the automatic transfer car provides a universal handling system able to spot a load anywhere on the floor of the plant. The same car system may also be used for moving materials between plant buildings.

**EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.**

Sales Offices in New York  
Philadelphia  
Pittsburgh



AN EASTON 100-TON  
cross-bay transfer car showing  
general details of construction.

**EASTON®**

A-1046

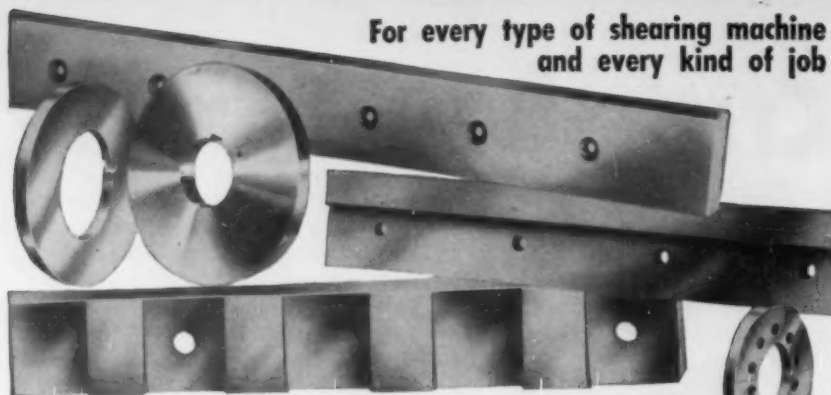


"Any guy could chop fast if his Dad made him a hatchet out of Columbia EXTRA Carbon Tool Steel!"

**COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.**

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.





For every type of shearing machine  
and every kind of job

**"multicut"**

**SHEAR BLADES and ROTARY KNIVES**

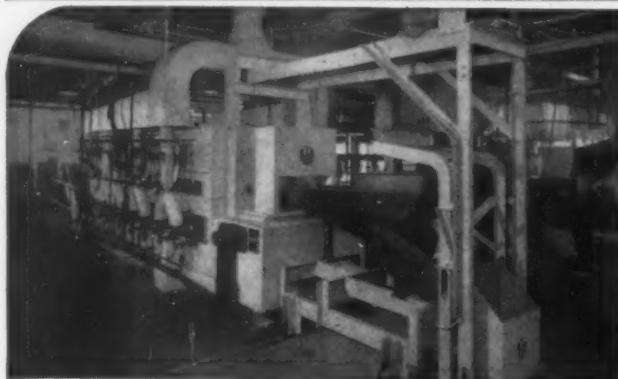
**Engineered to the job . . .** Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

**"MULTICUT", "TUFCUT", "HOT WORK"**

**THE WAPAKONETA MACHINE CO.**  
WAPAKONETA, OHIO.



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## LOW COST HEAT TREATMENT of small and medium size parts

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SPECIAL ATMOSPHERE TREATMENTS

**A SIZE AND TYPE  
OF FURNACE  
FOR EVERY  
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PRODUCTION**

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## Temperature transmitter

Process temperatures are sensed, and transmitted to a central recording or controlling station by a new instrument. It is a nonindicating device of the force balance

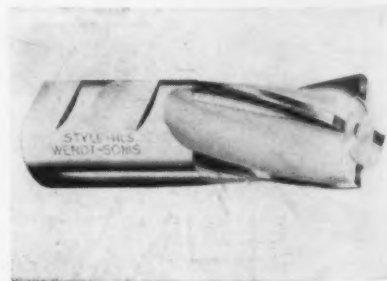


type with a calibrated accuracy of  $\frac{1}{2}$  pct of the temperature span and compensated for ambient temperature and barometric pressure variations. Spans ranging from 50° to 400°F are available and can be utilized between the limits of -100° and +1000°F. Instrument is weatherproof. *Foxboro Co.*

For more data circle No. 48 on postcard, p. 173.

## Carbide-tipped mills

Carbide-tipped end mills and shell mills are available with helical teeth. Smoother finishes are said to be obtained and less horsepower is required because the helical teeth maintain a constant cutting relation with the workpiece. Life of the



Shear-Carb cutting tools is reported to be increased two to three times as tool shock is reduced when helical teeth engage the work. End mills are offered in  $\frac{1}{2}$  to 2-in. diam, and  $1\frac{1}{4}$  to 6-in. diam for shell mills. Both are made in styles and in carbide grades to machine any material. *Wendt-Sons Co.*

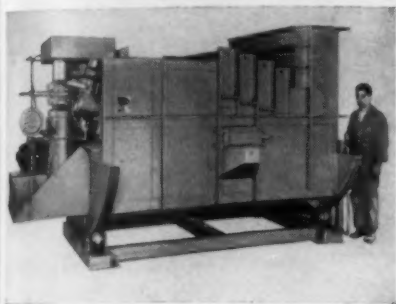
For more data circle No. 49 on postcard, p. 173.



## NEW EQUIPMENT

### Reverberatory furnace

This tilt-type reverberatory furnace built for ship repair work has a bath capacity of 6000 lb of brass. Combustion assembly and controls are designed to tilt with the furnace (cradled on rollers) when metal is being poured. Using light oil for fuel, two burners fire into the combination melting and holding cham-

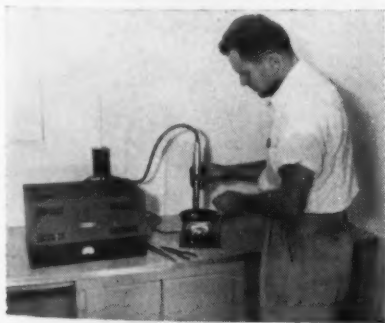


ber. Ingot is charged through the hopper. Only preheated metal reaches the melting zone, and only molten metal reaches the bath. It is stated the furnace will produce highest quality, homogeneous metal, free from oxide with minimum fuel cost and low metal losses. *Eclipse Fuel Engineering Co.*

For more data circle No. 50 on postcard, p. 173.

### Fluxless soldering

Ultrasonic equipment for fluxless soldering of aluminum, copper, brass, silver and magnesium consists of an ultrasonic generator, heating platen and a hand-operated soldering head. The Sonobond unit



is particularly well adapted to hermetic sealing problems, electrical wire joints and other moderate size work. It accommodates soldering tips 3/16 to 5/16 in. diam. This versatile hand tool is said to tin aluminum in 3 to 5 sec. *Aero-projects Inc.*

For more data circle No. 51 on postcard, p. 173.

MASONITE?  
METALS?  
PLASTIC?  
RUBBER?



## Got a Perforating Problem? See Hendrick for the Solution!



Sometimes the quickest, surest answer to design problems is very simple. In numerous cases, the inclusion of a pleasing pattern of perforations is just what is needed to make products more attractive and saleable. And whatever material you're using—be it metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes, Hendrick can help you.

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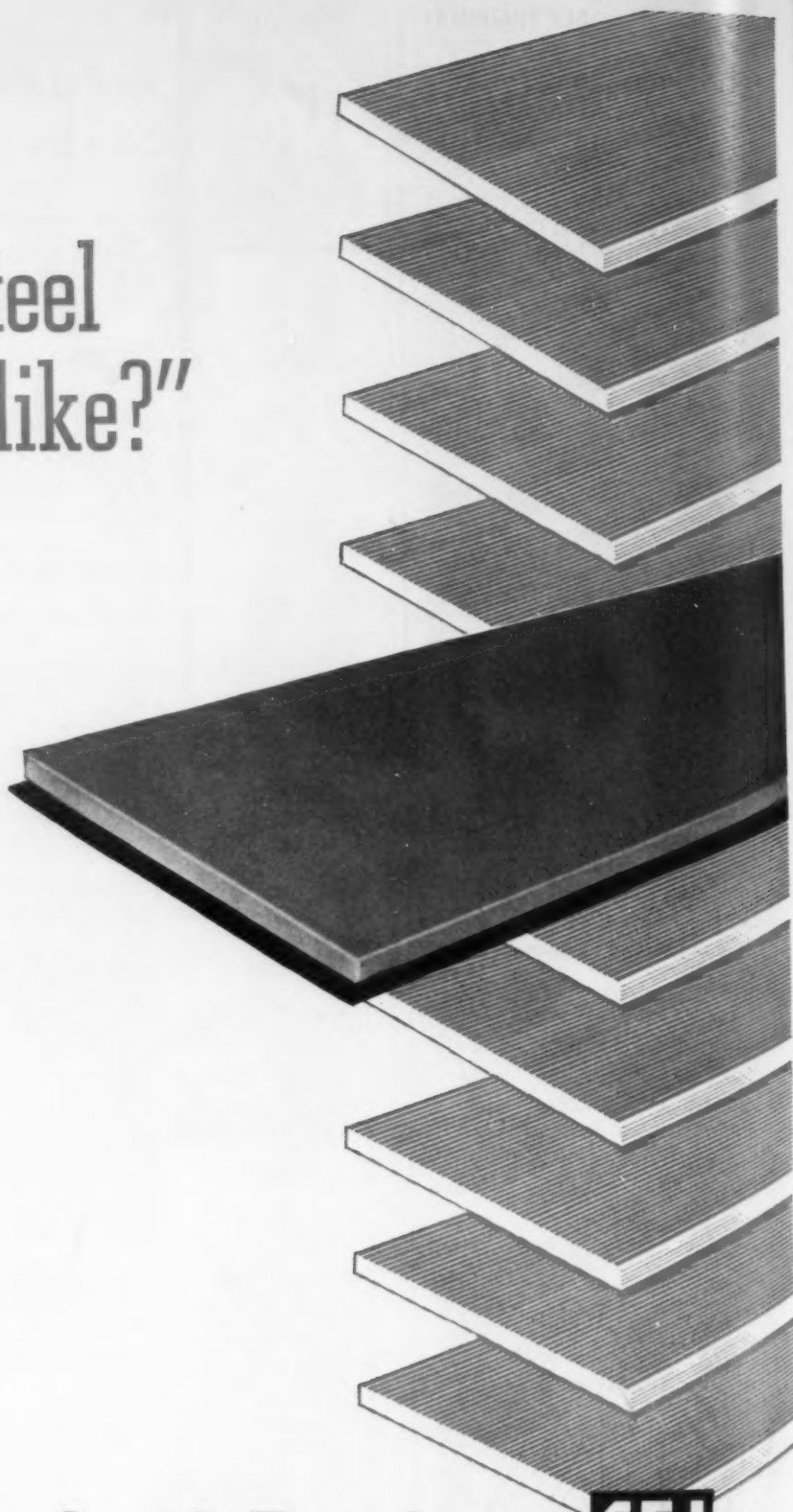
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## The Iron Age SUMMARY . . .

**Production climb still shows no sign of leveling off . . . Rate hits 80 pct of rated capacity . . . Improvement spreading through product lines.**

**Production . . .** The spectacular rise in steel production still shows no sign of leveling off. Steel-making operations this week are scheduled at 80.0 pct of rated capacity, an increase of 2.5 points from last week's revised rate. The steel ingot production index is estimated at 119 (1947-49 = 100).

This week's rate, another new high for the year, marks the eleventh consecutive week the industry's output has increased. Within the past 3 months steel production has zoomed more than 31 pct.

**New Orders . . .** Most steel producers had expected an improvement in their business. But they were not prepared for the rush of orders which has in some cases buried their clerical staffs under an avalanche of paper work. At least one mill is known to have turned down substantial orders for February delivery of cold-rolled sheets. The mill is reserving some space for old customers who are slow in ordering. Otherwise, it is booked up.

Despite record production schedules for the rest of this year, the large auto companies are holding back on commitments for 1955. The rush of orders for first quarter delivery is largely by

small and medium sized firms who are alarmed by the tightening market and want to make sure their orders are on the books.

**Demand . . .** This week sensational gain in cold-rolled sheet demand is accompanied by fairly sharp gains in some other steel products that had been lagging badly. Cold-rolled strip, and hot-rolled sheets and strip are also bouncing back. Plate is showing more moderate improvement. With galvanized sheet demand still going great guns (one mill is booked through March, 1955), and tinplate producers looking for another spurt in first quarter, the predicted general tightening of the flat-rolled market has become a fact.

But improvement in demand is not limited to flat-rolled products. Carbon bars, both hot-rolled and cold-finished, are gaining, the latter quite rapidly. Stainless demand continues to move up, and alloy steel is also gaining.

The oil industry, one of the industry's hottest customers most of this year but recently showing signs of less buying, is likely to buy more steel in first quarter of 1955 than it did in first quarter of 1954. Demand for construction steel continues to amaze the industry.

## Steel Output, Operating Rates

Production	This Week†	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,882	1,874	1,769	2,044
<b>Ingot Index</b>				
(1947-49=100)	117.2	116.7	110.1	127.2
<b>Operating Rates</b>				
Chicago	82.0	81.5	78.5	96.5
Pittsburgh	75.0	76.0*	71.0	84.0
Philadelphia	70.0	68.5	64.0	94.0
Valley	77.0	74.0	69.0	92.0
West	80.5	79.5*	77.5	91.0
Detroit	100.0	100.0	94.0	94.0
Buffalo	97.5	95.5	75.5	99.5
Cleveland	81.5	80.0*	71.0	94.0
Birmingham	63.5	64.0	74.0	96.5
S. Ohio River	85.0	85.0	88.0	73.5
Wheeling	94.0	96.0*	88.0	102.0
St. Louis	84.0	87.0*	76.5	89.0
East	61.0	51.0*	48.0	89.0
<b>Aggregate</b>	80.0	78.5	74.0	91.0

\* Revised. † Tentative

## Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
<b>Composite prices</b>				
Finished Steel, base	4.797	4.798	4.798	4.632
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$33.83	\$34.00	\$33.00	\$35.33
<b>Nonferrous</b>				
Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	91.375	90.625	92.875	83.00
Zinc, E. St. Louis	11.50	11.50	11.50	10.00



## Upsurge Advances Deliveries

**Boom in sheet products catches some tardy buyers with orders down . . . Delivery times stretch into first quarter . . . Bars, alloy, stainless, strip show new life.**

♦ SOME steel buyers are just now beginning to appreciate the strength of today's surging market. And some of them apparently are learning that they have put in their bid to the mills too late to receive delivery exactly when they need it.

Stampers in the Chicago district, for instance, are said to be due for a rude awakening on deliveries next month. The mills are doing their best to reserve space for old line customers, some of whom are taking a long time to commit themselves.

Automotive buyers have producers pulling their hair over first quarter 1955, refusing to place orders except for limited tonnages. Apparently the Detroit consumers are waiting to see how their new models make out with the public. When they finally do make commitments, first-quarter order books are likely to fill up more rapidly than some consumers think they will.

Cold-rolled sheet demand is still building up, although eastern mills probably have not yet felt the full impact. Hot-rolled sheets are gaining strength, as is strip. Galvanized shows no signs of abating. Stainless is moving up strong. Alloy belatedly moving from lukewarm to hot. Bars slowly gaining strength. Oil country goods strong but feeling effects of expanded capacity. Merchant pipe riding along on the building boom. Structural holding up unexpectedly well. Wire products fair despite seasonal decline of merchant wire. Plate showing signs of revival. Tinplate off seasonally but looking forward to a considerably better volume in first quarter '55.

**SHEET AND STRIP . . .** Some cold-rolled sheet consumers are talking to the mills about January-February delivery. In Chicago, resurgence of demand from stampers is compounding the problem of producers. Cleveland finds narrower widths booked into February but wider stock still available for December. One Eastern mill, although operating its cold mill 100 pct, is backed up 7 weeks on cold-rolled sheets. Pittsburgh mills as far out as they care to go at the moment. Hot-rolled sheets, which had been lagging, are booked into December in some areas. Strip demand is picking up belatedly. The switch from strip to slit coils has back-fired on some consumers. Detroit finds some deserters swinging back to strip sources because they can't get delivery on slit coils; and they're finding the strip people booked well into December. Other consumers are finding that slit sheet does not meet their requirements.

Alan Wood Steel Co. announced prices of \$5.00 and \$5.80 per cwt for cold-rolled sheets and cold-rolled strip, respectively, for product from new cold mill expected to start up in late December or early January.

**GALVANIZED SHEETS . . .** Continuous galvanized demand appears to be insatiable. In the East, delivery is running 20 weeks; in Chicago, one producer is booked solid into March. Hot-dip also is strong. The usual seasonal slump is nowhere in sight.

### Purchasing Agent's Checklist

- BUSINESS:** Rebound from recession will lift '55 indexes . . . p. 95
- PETROLEUM:** Signs point toward continued growth next year . . p. 99
- CASTING:** Investment process in healthy adolescence . . . p. 105
- TOOLS:** Makers show new models, predict '55 gains . . . p. 131

**STRUCTURALS . . .** With construction continuing at high level, the market is holding steady. The East reports a slight tonnage increase over October. Chicago is on dead center, and there is slight chance of an improvement. West Coast market is also holding steady.

**BARS . . .** Although business has improved, the bar market apparently is still weighed down by an inventory millstone. Some normally big customers are not in the market too strong as yet. But alloy bars are beginning to surge. A Pittsburgh mill says November will be his biggest month in 1954 and he expects December to set a new record for the year. In Chicago hot-rolled carbon bars are on 2-3 week delivery basis and moving up; cold-finished is better (3-4 weeks) and some good customers have not been heard from. Improvement noted in Detroit, also. Both carbon and alloy improving in the East, where reinforcing bars are still strong.

**OIL COUNTRY GOODS . . .** Markets strong but competition definitely here as new capacity makes itself felt. Inventory correction also a factor in fourth quarter. In the East, fourth quarter volume is off 20 pct, although the easing in other centers appears to be limited to reduction of backlogs. First quarter ordering is shaping up to be more orderly.

Jones & Laughlin Steel Corp. has started up new finishing facilities for producing oil country goods in high strengths necessary for deep well drilling. The \$4.7-million project is the first step in expansion of such facilities. Additional expansion plans are included in \$51 million expansion program announced recently by Jones & Laughlin.

**MERCHANT PIPE . . .** The butt-weld market is strong. In the East, November looks like a record month for the year—10 to 20 pct above September; business was off in October. In Pittsburgh, mills are operating around 85 pct of capacity but maintaining good inventories for quick delivery.

**TUBULAR SPECIALTIES . . .** Producers are fighting for available mechanical and boiler tube business, although there has been a slight improvement. Chief trouble with mechanical tubing is slack production of mortar shells; gas bottle business is fair. Pressure tubing is off in the East following a good business during September.

# Comparison of Prices

(Effective Nov. 16, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.  
Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 16 1954	Nov. 9 1954	Oct. 19 1954	Nov. 17 1953
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.82	5.82	5.513
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
<b>Tin and Terplate: (per base box)</b>				
Tinplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
<b>Bars and Shapes: (per pound)</b>				
Merchant bars	4.30¢	4.30¢	4.30¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
<b>Wire: (per pound)</b>				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
<b>Rails: (per 100 lb.)</b>				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20
<b>Semifinished Steel: (per net ton)</b>				
Revolving billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
<b>Wire Rod and Skelp: (per pound)</b>				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
<b>Finished Steel Composite: (per pound)</b>				
Base price	4.797¢	4.798¢	4.798¢	4.632¢

**Finished Steel Composite**  
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite**  
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

**Steel Scrap Composite**  
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Nov. 16 1954	Nov. 9 1954	Oct. 19 1954	Nov. 17 1953
<b>Pig Iron: (per gross ton)</b>				
Foundry, del'd Phila.	\$61.10	\$61.10	\$61.10	\$61.10
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
<b>Pig Iron Composite: (per gross ton)</b>				
Pig iron	\$56.50	\$56.50	\$56.50	\$56.50
<b>Scrap: (per gross ton)</b>				
No. 1 steel, Pittsburgh	\$35.00	\$35.50	\$34.50	\$37.50
No. 1 steel, Phila. area	33.00	33.00	31.00	34.50
No. 1 steel, Chicago	33.50	33.50	33.50	34.00
No. 1 bundles, Detroit	27.50	26.50	26.50	29.50
Low phos., Youngstown	35.50	35.50	35.50	39.50
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	45.50
No. 1 mach'y cast, Philadel'a.	42.50	42.50	42.50	42.00
No. 1 mach'y cast, Chicago	42.50	42.50	43.50	39.00
<b>Steel Scrap Composite: (per gross ton)</b>				
No. 1 heavy melting scrap	\$33.83	\$34.00	\$33.00	\$35.33
<b>Coke, Connellsville: (per net ton at oven)</b>				
Furnace coke, prompt	\$14.38	\$14.38	\$14.38	\$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
<b>Nonferrous Metals: (cents per pound to large buyers)</b>				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.75†
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	91.375†	90.625*	92.875	83.00
Zinc, East St. Louis	11.50	11.50	11.50	10.00
Lead, St. Louis	14.80	14.80	14.80	13.30
Aluminum, virgin ingot	22.20	22.20	22.20	21.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. \* Revised.

## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

→To identify producers, see Key on P. 219→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo I11	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	56.50	57.00	
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50		
Duquesne L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	56.50	57.00	
Erie I4	56.00	56.50	56.50	57.00	
Everett M6		61.00	61.50		
Fontana K1	62.00	62.50			
Geneva, Utah C7	56.00	56.50			
Granite City G2	57.90	58.40	58.90		
Hubbard Y1			56.50		
Minnequa C6	58.00	59.00	59.00		
Monessen P6	56.00				
Neville Ial. P4	56.00	56.50	56.50		
Pittsburgh U1	56.00			57.00	
Sharpsville S3	56.00	56.50	56.50	57.00	
So. Chicago R3	56.00		56.50		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedeland A2	58.00	58.50	59.00	59.50	
Toledo I4	56.00	56.50	56.50	57.00	
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	
N. Tonawanda T1		56.50	57.00		

**DIFFERENTIALS:** Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct; \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

**Silvery Iron:** Buffalo, H1, \$68.25; Jackson, J1, G1, \$67.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferroalloy prices are \$1 over comparable silvery iron.

## STAINLESS STEEL

Base price cents per lb., f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingot, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25		27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75-63.00	50.50-50.75	59.25	34.25	41.25	34.75

### STAINLESS STEEL PRODUCING POINTS:

**Sheets:** Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, El; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4.

**Strip:** Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (.25¢ per lb higher) W1 (.25¢ per lb higher); New Bedford, Mass., R6.

**Bar:** Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3; Ft. Wayne, I4.

**Wire:** Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

**Structurals:** Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

**Plates:** Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15.

**Forged discs, die blocks, rings:** Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

**Forgings billets:** Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

## Weaker Market Softens Prices

**Price resistance by consumers weakens prices for some grades . . . Pittsburgh openhearth grades dip . . . Composite price off to \$33.83 . . . But ingot rate keeps rising**

♦ CONSUMER resistance to rising scrap prices has softened the price structure in some grades in several areas, despite a climbing steel operating rate.

Major drop-off came in Pittsburgh, where openhearth grades fell 50¢, with No. 1 steel now quoted at \$35 per gross ton. THE IRON AGE Heavy Melting Steel Scrap Composite Price fell 17¢ to \$33.83 per gross ton.

In view of the climbing operating rate and the present flourishing steel business, it's fairly safe to assume that this weakening is only temporary. In Chicago, for example, considerable price resistance has not as yet had any real effect on prices. Orders for tonnages at below previous prices were bringing in little if any material.

Against the overall pattern this week, Detroit openhearth prices rose \$1, reflecting stepped up automotive activity and steel demand.

**Pittsburgh . . .** Due to consumer disinterest, the market here is tending toward softness for the short-term. Relatively small tonnages of openhearth grades have been sold at lower prices, and some of these lots could be classified as distress material. Offsetting this are purchases at higher prices, making the net result moderately easier temporarily. Two mills have placed blast furnaces in operation in order to reduce scrap consumption. To recognize these influences, THE IRON AGE is adjusting its quotations on openhearth grades downward to a single price, making No. 1 heavy melting a flat \$35.

**Chicago . . .** While dealer material continued to move in scattered grades at below previous price levels, Chicago's buying market was holding firm at press time this week. Orders for tonnages at below previous market prices, particularly in turnings, were

bringing in no material, and expectation of a rise in buying activity by consumers at the end of November is making low price scrap increasingly difficult to get. With operating rates continuing to advance scrap on hand looks like a good bet to many of the yards. Net effect has been to hold selling prices in a very slow market.

**Philadelphia . . .** End of the dock strike here late last week froze the market in the face of softer tendencies and prevented any significant price reductions in steel grades. Before the strike ended a couple of small sales were made at slightly lower prices. Cast items showed varied trends with cupola cast dropping back to a range of \$34 to \$35 from the earlier \$2 spread and new sales of malleable cast pushing that price up \$3.

**New York . . .** Continued good demand, both for export and for domestic mills, firmed openhearth and turnings prices here, with these grades registering \$1 per ton increases. Move came as no surprise, however, as pressure had been building up for some time, reflecting increased activity in adjacent consuming areas.

**Detroit . . .** Demand for No. 1 openhearth grades remained strong. Continued buying from local consumers and some outside strength brought prices up at least \$1, more in some cases. A change in buying practices of a major consumer did away with differentials between some grades that had previously existed. Cast continues firm, but secondary grades are soft, resulting in a drop of \$1 for No. 2 heavy melting.

**Cleveland . . .** November may be the highest tonnage month for the year if dealer shipments continue at present rates. In Cleveland mills are accepting all shipments on orders placed earlier at prevailing prices. Dealers are cleaning out because they

feel ceiling has been temporarily reached. Market remains steady to soft in spots with no major price changes. Valley mills are also taking unrestricted shipments on old orders but some softness shows up in new purchases. Sources being restricted by some mills.

**Birmingham . . .** The scrap market appears to have leveled off, with a greater flow of No. 2 bundles to mills as a result of weakness in this item. Cast is coming into the district a little better from the Carolinas and Tennessee. The railroad list closing this week brought the same or slightly higher prices than last month due to anxiety of brokers and dealers for No. 1 grades to balance No. 2 steel and No. 2 bundles for export orders. Turnings and borings declined \$1.

**St. Louis . . .** While prices for scrap are unchanged the undertone of the market is weak. Mills are operating at a lower operating rate as compared with two weeks ago.

**Cincinnati . . .** One area mill is buying direct from dealers, eliminating independent brokerage commissions. Dealers are supposed to ship from own yards but can make up shortages from others. Shipments in Cincinnati area are at record levels as dealers unload, similar to Cleveland situation.

**Buffalo . . .** Movement of scrap to mills both by rail and water is heavy. Local dealers are shipping against recent orders while a leading mill purchased approximately 60,000 tons in the Detroit area to enliven an otherwise dull season on the Lakes. Five boats have been hauling scrap here from the Michigan area. Prices are steady with mills willing to increase orders at prevailing ranges. Buffalo steel rate up 2 points to 97½ pct. Bethlehem adding another furnace.

**Boston . . .** Activity in the New England scrap market is fair with more mills coming into the market. There's no rush but demand exists for almost all grades. No. 1 and No. 2 heavy melting and No. 1 busheling are quoted higher this week.

**West Coast . . .** With the new higher prices prevailing in San Francisco, scrap is now rolling pretty freely to mills. The mills are buying, and scrap men are now selling where previously they held back—certain a price hike was coming through.



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# Zinc Stocks Off 23,000 Tons

**Heaviest shipments in 2 years cut smelter stocks to 152,137 tons . . . Order backlogs up . . . Stage set for possible price increase . . . London lower—By R. L. Hatschek.**

♦ ZINC statistics for October were the most optimistic to come along in quite a while. Smelter stocks of slab zinc declined 23,368 tons to 152,137 tons. This is a decline of approximately 25 pct since the government stepped into the market in June with renewed stockpiling activity. Stocks at the beginning of October stood at 175,505 tons.

But the most encouraging feature of American Zinc Institute's picture of the industry is found in the shipment columns. Shipments to domestic consumers totaled 78,867 tons for the month—the highest since November 1952. Export and drawback was 1468 tons and 10,080 tons went to government account, somewhat less than the previous 3 months. This brought total shipments to 90,415 tons, also the highest since November 1952, and some 12,500 tons better than September's 77,885-ton total.

At the beginning of this month unfilled orders stood at 51,559 tons. This is the highest point since March 1953.

Production, at 67,047 tons, was 7000 tons better than September output but was still lower than at any time since 1949. Reason for the low output during these 2 months, of course, was that the Garfield, Utah, smelter was strike-bound for most of the period. Output will gain again this month.

ZINC . . . Thus, with smelter stocks at the lowest point since September 1953, order backlogs at a healthy level, consuming demand maintaining a brisk pace, and the government continuing to siphon off good tonnages, zinc is in a definitely optimistic situation. Stockpile buying is a virtual guarantee that zinc prices will not decline.

Just about the only weakening tone is displayed in the London market where prices at the end of last week were about 0.4¢ per lb below parity with the New York market.

So don't discount the possibility of an early increase in zinc prices.

LEAD . . . Business volume turned up a bit toward the latter part of last week but the trade is still wondering where the battery industry is and when it is going to do some heavy buying. This was generally expected before this date.

Opposite the zinc picture, London prices remain well ahead of parity with New York lead quotations (about 0.75¢ per lb higher at the end of the week) and smelter and refiner stocks were reported higher at the beginning of October. Increase was about 10,000 tons.

COPPER . . . High-flying London copper prices stalled out late last week and lost all the altitude they'd gained early in the week. London spot price hit 35.375¢ per lb at mid-week, tumbled back to 34.25¢ in 2 days.

On this side of the Atlantic, consumers still didn't seem to be getting as much copper as they wanted—but

the market's edge has been dulled and premium deals are evaporating. General Services Administration indicated that some 18,000 tons of government-released copper has already been delivered to consumers.

In Chile there were some rumblings of unhappiness about this U. S. government action of stabilizing the market by releasing metal. The South American country is also reported to be pressing the mining companies to increase their copper production.

ALUMINUM . . . September shipment statistics of the Aluminum Assn. showed minor declines in most categories of mill products. Exceptions were: drawn tube, both hard and soft alloys; rolled rod and bar; ACSR and cable, and forgings. Foundry total was up primarily as a result of a 500 ton increase in shipments of diecastings—sand and permanent mold castings were practically unchanged.

Following are September aluminum mill product shipments compared with August totals. Figures for all products are in net tons:

	Sept.	Aug.
Sheet & Plate, total...	43,563	45,665
Non-Heat-Treatable...	34,520	35,679
Heat-Treatable...	9,043	9,986
Foil...	6,450	7,014
Extruded products, total	11,313	11,891
Soft Alloys...	9,343	9,690
Hard Alloys...	1,971	2,201
Tube, Drawn, total...	1,857	1,786
Soft Alloys...	1,560	1,510
Hard Alloys...	297	276
Rod & Bar, Rolled...	6,703	6,457
ACSR & Cable, Bare...	4,876	4,541
Wire, Other than Conductor...	1,668	1,861
Forgings...	1,724	1,646
Castings, total...	10,356	9,926
Sand...	788	771
Permanent Mold...	4,895	4,962
Die...	4,673	4,192

MAGNESIUM . . . Cutback of operations at Velasco (THE IRON AGE, Oct. 14, p. 87 and Nov. 4, p. 174) chopped production to 4184 tons in September as compared to 5771 tons in the previous month. This was the fourth consecutive month of decline. Wrought product shipments for the month, however, increased 6 pct to 591 tons.

The month older foundry statistics showed a 12 pct gain in August, bringing total castings shipments to 1078 tons. Sand castings and diecastings registered good gains, while permanent mold castings slipped.

Frank Nichols, president of Nichols Wire & Aluminum Co., called for renewed emphasis by the military on weight reduction in all types of equipment. Speaking at the Magnesium Assn.'s annual meeting (which began Monday), he stressed the vital role of airlifts in the event of war.

## Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Nov. 10	Nov. 11	Nov. 12	Nov. 13	Nov. 15	Nov. 16
Copper, electro, Conn.	30.00	....	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	....	30.00	30.00	30.00	30.00
Tin, Straits, New York	89.875	....	90.875	....	91.375	91.375*
Zinc, East St. Louis	11.50	....	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	....	14.80	14.80	14.80	14.80

Note: Quotations are going prices

\*Tentative